BI Norwegian School of Management

Thesis Report

Family Firms and Diversification

Area of study
Corporate Governance

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Abstract

In this paper we empirically examine whether family firms diversify more than comparable non-family firms. Our sample includes between 40,000 and 50,000 Norwegian firms from 1994 to 2007. We analyze both listed and private firms, but private firms account for more than 99 percent of the sample. We find strong support for our hypothesis that family firms diversify more than non-family firms. We also find that family firms tend to survive longer than non-family firms; consistent with higher diversification and that they tend to have a longer investment horizon. Furthermore, we find no evidence of family firms being more inclined to choose low-risk industries. Consistent with other papers, we also find that family firms generally have higher return on assets than non-family firms.

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Introduction

A paper from Berzins, Bøhren and Rydland (2008) found several characteristics that differ between listed and nonlisted companies in Norway. One such difference is that nonlisted firms have more concentrated ownership, particularly when families control them. This probably means that large owners of nonlisted firms, which are often families, invest a particularly high portion of their wealth in just one firm (Bøhren 2008). One likely consequence of this is that these owners are not well diversified investors in terms of spreading risk across a large number of assets, and that they therefore diversify by investments within the company. In this paper we want to investigate the presence of such diversification in family firms.

Existing theory

According to portfolio theory investors should diversify to eliminate idiosyncratic risk by investing in a large number of assets. It is unlikely that a firm could diversify to the same extent as investors at the same cost. For families with large portions of their wealth invested in one firm, diversifying according to portfolio theory may not be feasible or desired. For such owners it might be optimal to diversify within the firm itself, for example by expanding to new markets. The existence of conglomerate discount implies that such a diversification is costly (Berger and Ofek 1995) (Bøhren and Michalsen 2006, 93). Thus, this creates a potential conflict of interest between minority owners and majority owners, assuming that minority owners are more diversified than the majority owners. This conflict of interest is a part of what is often referred to as the second agency problem (Villalonga and Amit 2006), and it implies that family firms tend to diversify more than comparable non-family firms.

However, most of the research done on family firms and performance show that there is a positive relationship between family ownership and performance, particularly for family firms managed by the founder. A recent paper by Bøhren and Ødegaard (2006) found that for Norwegian private firms, the performance in terms of market value increase with insider holdings up to proximately 40 percent, and then decreases. Maury (2006) found in their sample that active family control outperforms non-family control, and that passive family control has no effect.

Villalonga and Amit (2006) also found a positive relationship between active family control and performance. They also checked for possible differences in diversification, by creating a diversification dummy based on number of segments the firms operates in,

but found no significance for such a relationship. Anderson and Reeb (2003) found that family ownership increased value, compared to non-family firms. This effect was further increased when the family actively engaged in management. Bennedsen et al. (2007) was the only paper we found that concluded that family involvement in management after the first generation tends to be inferior to professional outside management.

The research mentioned above has explored very little of the underlying reasons for this premium puzzle, most likely because there has been limited availability of necessary data. Also, the research has almost exclusively been done on listed companies although non-listed companies account for the vast majority of economic activity (Berzins, Bøhren and Rydland 2008). The Centre for Corporate Governance Research has collected comprehensive data on listed and non-listed firms covering more than a decade, with data on family relationships and ultimate ownership. This opens for the possibility to look deeper into the family firm premium puzzle.

To conclude, from theory one should expect family firms to diversify, yet from empirics they do not appear to be punished with any discount, or that the discount is more than offset by lower agency costs. We therefore want to closer investigate the presence of diversification in family firms.

Research design

In our analysis we want to investigate whether family firms diversify more than non-family firms. To answer this we need to measure the diversification in the firms. Since diversified firms are likely to have more stable accounting figures, we use a volatility measure as a proxy. Our focus is the operational behavior of the firm, so the volatility measure should be based operational figures. However, we need to control for several other factors that are likely to influence the diversification proxy as well.

Company size is likely to have a large effect on the company volatility for a number of reasons. A large firm is more likely to be well established with steadier income, than a small firm. Larger firms may also be more able to explore new opportunities to a larger extent, since they probably have more resources, and is thus in a better position to diversify across markets. In addition, a concentrated owner in a large firm will have more of his wealth invested, compared to owning the same portion of a small firm. A risk averse owner will probably want to diversify more as the company increase in value, because he will have less marginal utility of increasing wealth. This is also implied by the

loss averse abnormality in prospect theory (Kahneman 1979). We expect that these effects will sum up to a significantly negative influence on firm volatility.

Financial leverage ratio has a proven effect on the total firm risk, but since our focus is purely operational it is not likely that this will have a direct effect on our volatility measure. However, a company with high financial leverage may have greater incentives to diversify in order to secure a stable income. The causality of the argument may also be reversed, as a firm with stable income may also have easier access to high leverage. Regardless of causality, we expect high financial leverage to have a negative influence on firm volatility.

The type of industry a company operates in is also likely to have a large impact on the firm volatility. We therefore expect that the industry risk will have a very significant positive impact on our volatility measure.

Sample

To produce our sample we apply the following filters:

- Filter 1: Remove all companies without limited liability
- Filter 2: Require positive operating income
- Filter 3: Require positive assets
- Filter 4: Exclude firms that never have employees over the sample period
- Filter 5: Exclude parent companies
- Filter 6: Exclude firms with less than ten observations of cash flow or operating income over the sample period.

Filter 1-4 ensures that the firms in our sample have limited liability and are active. Filter 5 prevents us from including consolidated accounting figures since we are primarily interested in investigating the diversification within individual firms. Filter 6 ensures a minimum quality requirement for calculating our diversification proxy. This will probably cause a survivorship bias in our sample. The bias will most likely cause operating income to be larger because firms have more time to grow, and cash flows to be larger because survivors probably have more positive cash flows. The effect on financial leverage ratio is not as easily determined. This restriction is, however, a necessary tradeoff between the quality of our diversification proxy and this bias.

These filters reduce the sample size to between 40,000 and 50,000 firms, of which more than 99 percent are privately held.

Data and variables

The CCGR *(Centre for Corporate Governance Research)* database contains 14 years of yearly data from all listed and non-listed Norwegian firms. Item descriptions and definitions are available in Berzins et al. (2008). We have accounting data available from 1994 to 2007, and family ownership data from 2000. We will perform a cross sectional regression on data from the years 2000 and 2005.

We define a family firm as a firm which is 50 percent or more owned by one particular family. This is the legal definition of control, and has an intuitive appeal to most people. The definition implies that the family has control of the board, but does not ensure that the family controls all issues, like charter amendments. The CCGR database includes data on kinship and marriage, so we are able to determine genuine ultimate family ownership. We will run the analysis using fraction held by a family as well, to see whether diversification is increasing with higher ownership concentration.

As proxies for the firms' diversification we calculate company risk using normalized standard deviation in operational income and cash flows from operation. The reason for using measures based on operational figures is that these will be more stable in a diversified firm than in an undiversified firm, and that they do not include investments and other extraordinary items that are more volatile by nature. With these measures we want to capture all types of risk averse behavior in the firms' operations, including diversification in the product markets, as well as diversification across markets and industries. For normalization we use coefficient of variation $\left(\frac{\sigma_i}{\mu_i}\right)$. This method is vulnerable to negative values, because of the division by the mean. This complicates the normalization of cash flows, since negative cash flows are frequent which cripples the mean. This is not an issue when using the volatility of operational income. In effort to remedy the problem with cash flows, we use absolute values of the mean. In the cases where the mean is very close to zero we will probably get extreme values. These will be excluded by running casewise diagnostics in our regressions. This procedure may cause some skewness in the volatility measure, but using cash flows still has the advantage of not being exposed to earnings management. However, if we assume that the smoothing of accounting data is equally distributed across firms, the relative differences in volatility will not be compromised. This implies that the two measures should give similar results. We assume lognormal distribution of the volatilities across firms, and therefore use the log-normalized standard deviation in our volatility measures. We also assume that firms that are defined as family firms in our sample remains family firms throughout the entire

sample period when calculation the diversification proxies. This is a reasonable assumption, because ownership structure in nonlisted firms tends to be quite stable (Berzins, Bøhren and Rydland 2008). This method gives us a normalized company volatility measure, which serves as our proxy for diversification throughout this paper.

An alternative approach for measuring diversification would be to look at number of segments the firms are represented in (e.g. Villalonga and Amit 2006); however there are two important arguments against this. Firstly, this would not capture diversification in the product market, and secondly the data is likely to be of lesser quality because firms do not necessarily register properly in all industries they are represented in.

We measure the firm size by operating income, because there are no observable market values for non-listed companies. Since this is close to log-normally distributed, we use the log of operating income in our analysis. We expect this size measure to be more neutral to industry than assets or employees.

To estimate the industry risk we define the industries using level 3 North American Industry Classification System (NAICS). There are totally 54 industries represented in our sample. We calculate the industry risk using arithmetic average of our diversification proxy for each industry.

Financial leverage ratio is calculated by leverage over equity, and is available directly from the CCGR database.

Regression model

The regression model is summarized in the following table:

Theoretical variable	Empirical proxy	CCGR data item	Expected sign
Diversification proxy	Log-normalized STD of CF	124	Dependent
	Log-normalized STD of operating income	11	Dependent
Family firm	Family firm dummy	15302	-
	Fraction ultimately held by largest family	15302	-
Firm size	Log of operating income	11	-
Financial leverage	Financial leverage ratio	122	+
Industry risk proxy	Arithmetic average of diversification proxy for each industry code	11103	+

Table 1: Regression coefficients

We will run cross-sectional regressions for the years 2000 and 2005, using the different proxies for checking robustness over time and measurement.

Main results

Descriptive statistics

Table 2 provides descriptive statistics for all firms, family firms and non-family firms, in our sample. Non-family firms tend to be significantly larger in size than family firms on average, measured by operating income. However, by looking at Figure 1 we can see that firm size is comparable in the entire sample except in the 1st decile, where the average of non-family firms is approximately two times the average of family firms. This indicates that the difference in mean size is solely due to a few very large firms.

From Figure 1 we can also see that the relationship between firm size and volatility in operating income is non-linear. It seems that the volatility in operational income is quite stable once firms are above a certain size, about 2.8 MNOK in our sample, whereas there is an exponential relationship when firms are small. One explanation of this high volatility in small firms may be very rapid growth (Hall 1987). It is also interesting to notice that the risk in non-family firms stays above the risk in family firms regardless of size, except in the 10th decile.

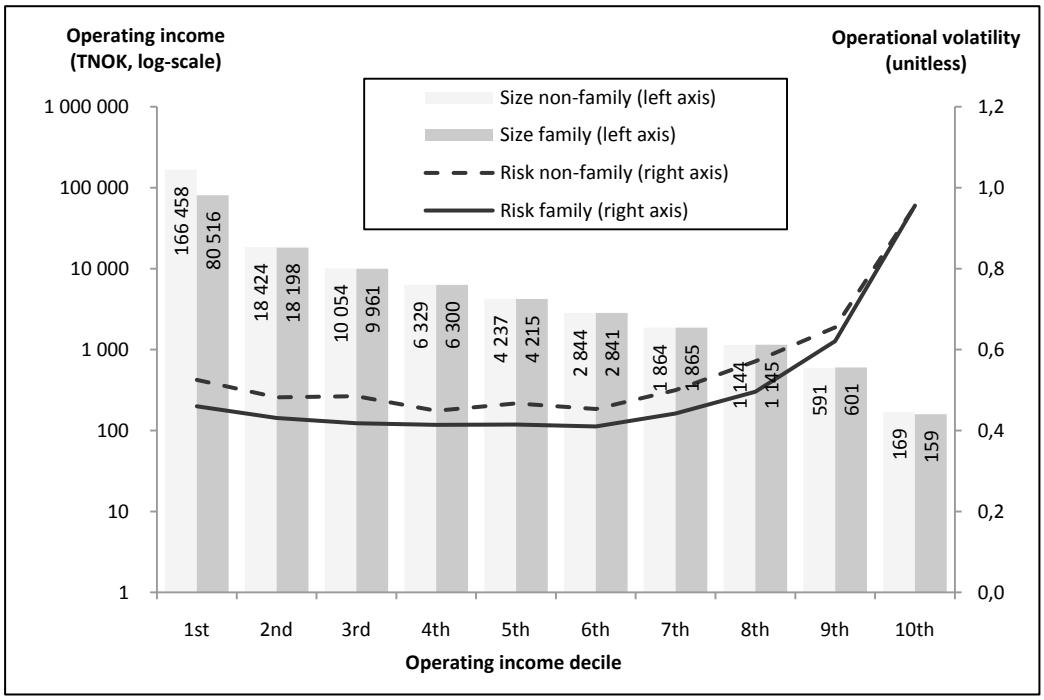

Figure 1: Distribution of operating income and normalized standard deviation of operating income grouped by family and non-family firms from 2005. The left axis shows operating income as a proxy for firm size on a logarithmic scale of TNOK. The right axis shows normalized standard deviation of operating income as a proxy for firm risk (unitless).

Descriptive statistics for 2005

	All firms			Family			Non-family				
	Mean	Median	Std. Deviation	(a) Mean	Median	Std. Deviation	(b) Mean	Median	Std. Deviation	Difference in means (a - b)	T-statistic (p-value)
Diversification proxy											
using operating income	.519	.409	.391	.515	.404	.390	.532	.422	.395	-.018	-4.101 (.000)
using cash flow	1.013	.943	.600	1.024	.956	.604	.981	.901	.589	.043	6.391 (.000)
Operating income (TNOK)	16,310	3,440	200,080	10,409	2,885	52,544	33,287	5,782	383,106	-22,878	-6.323 (.000)
CF from operations (TNOK)	37.47	6.03	1,061	39.98	6.09	1,130	30.26	5.92	832	9.72	.967 (.333)
Financial leverage ratio	3.903	2.260	64.392	3.818	2.240	69.445	4.148	2.330	46.919	-.329	-.561 (.575)
Industry risk proxy											
using operating income	.671	.658	.140	.665	.645	.139	.689	.701	.141	-.024	-15.707 (.000)
using cash flow	1.051	1.069	.082	1.049	1.069	.082	1.056	1.069	.081	-007	-7.302 (.000)
ROA	11.76	10.67	125.25	11.76	10.63	126.58	11.74	10.78	121.36	.027	.020 (.984)
Fraction held by largest family	77.0	100	29.2	91.8	100	14.7	34.3	34.6	14.9	57.5	353.73 (.000)
Number of observations	43,606			32,358			11,248				

Table 2: Descriptive statistics for 2005 grouped by all firms, family firms and non-family firms. The diversification proxy is calculated by normalizing the standard deviation of operating income and cash flows from operations, respectively. Operating income and cash flow from operations are stated in thousand NOK. The industry risk is calculated as arithmetic average of the diversification proxy within each level 3 NAICS industry code, based on operating income and cash flow from operations, respectively.

We find that our diversification proxy based on operating income show significantly lower mean volatility for family firms, whereas the proxy based on cash flows show significantly higher volatility in family firms. The medians show the same tendencies. This is ambiguous; we would expect both measures to give similar results. However, we exercise special caution when interpreting the proxy means based on cash flow from operations, because they may be influenced by our normalization method.

Table 3 shows different family ownership measures ranked by ascending company volatility based on our diversification proxy using operating income. From our hypothesis we expect that family ownership would decrease with increasing risk. However, we find no clear indication of this from Table 3. It seems that family firms are quite evenly represented across risk groups.

Ownership characteristics at different levels of volatility for 2005

Company volatility decile	Mean of fraction held by largest family	Median of fraction held by largest family	Ratio of family firms
1st	81 %	100 %	73 %
2nd	78 %	100 %	74 %
3rd	78 %	100 %	75 %
4th	77 %	100 %	75 %
5th	75 %	97 %	73 %
6th	75 %	99 %	72 %
7th	76 %	98 %	73 %
8th	76 %	100 %	74 %
9th	76 %	100 %	74 %
10th	77 %	100 %	73 %

Table 3: Ownership descriptives ranked by ascending company volatility based on operating income.

Table 2 shows no significant difference in ROA between family and non-family firms. This is surprising because other papers have found a positive relationship between family firms and performance. We suspect that ROA can be influenced by the survivorship bias in our sample. If this is the case, ROA should be decreasing as we relax the survival restriction. To investigate this we look at ROA while lowering the required number of years of observations (filter 6) in our sample, keeping all else equal.

Table 4 shows that mean ROA for all firms is in fact increasing as the survivorship bias gets more prevalent, going from 9.08 with no survival requirement to 11.76 with a survival requirement of ten years. What is even more interesting is that both the mean and median ROA of family firms appears to be far less impaired by the bias than non-family firms. Simple t-tests for difference shows that the differences are significant at the five percent level up to five required number of years of survival.

ROA statistics for 2005

Required number of years of survival	All firms			Family firms			Non-family firms		
	Mean	Median	No. of obs.	Mean	Median	No. of obs.	Mean	Median	No. of obs.
10	11.76	10.67	43,630	11.76	10.63	32,372	11.74	10.78	11,258
9	12.13	10.68	47,799	12.73	10.70	35,341	10.44	10.62	12,458
8	11.91	10.70	52,127	12.48	10.72	38,155	10.35	10.64	13,972
7	11.72	10.65	56,325	11.72	10.74	40,815	10.10	10.49	15,510
6	11.44	10.59	60,754	12.25	10.70	43,711	9.36	10.32	17,043
5	10.89	10.46	65,261	11.87	10.57	46,617	8.41	10.19	18,644
4	9.89	10.23	69,940	11.08	10.40	49,633	7.00	9.85	20,307
3	9.31	10.13	70,595	10.55	10.30	50,053	6.27	9.72	20,542
2	9.08	10.07	70,837	10.37	10.25	50,211	5.93	9.65	20,626
1	9.08	10.07	70,840	10.37	10.25	50,213	5.93	9.65	20,627

Table 4: Mean and median of return on assets for 2005 with different survival restrictions in filter 6, grouped by all firms, family firms and non-family firms.

This implies that most of the worst performers are non-family firms, and that these firms tend to not survive as long as family firms. The same is observable by looking at the number of firms. The number of non-family firms is reduced by approximately 45 percent, whereas the number of family firms is only reduced by approximately 36 percent. This suggests that family firms take lower risk on average, or that they generally have a longer investment horizon as proposed by Anderson and Reeb (2003).

Even though the descriptives in Table 2 shows no significant difference in mean ROA between family and non-family firms, this appears to only be the case for year 2005. Running the same descriptives for year 2000 and 2003 shows a significantly higher ROA for family firms, even with filter 6. We will therefore proceed with minimum ten observations in filter 6 in our model.

Anderson et al. (2003) argues that family firms have substantial economic incentive to retain control of their company, and one method of doing so is to finance with debt rather than equity (Stulz 1988). We would therefore expect that family firms use more leverage than non-family firms to prevent loss of control. However we find no such significant difference in financial leverage ratio in our sample.

Table 2 shows that the mean industry risk using operating income is significantly lower for family firms, which is also indicated by the median. Based on cash flows from operations we also find a significant lower mean industry risk for family firms; although the median shows no difference. Overall, this suggests that family firms could be more inclined to choose industries with lesser risk. To explore this further we have listed the distribution of firms in each industry, and the associated industry risk in Table 5.

Distribution of firms by industry

NAICS Code	NAICS Label	All firms	Family	Non-family	Density of family firms in industry	Industry risk proxy
1	Agriculture and hunting	189	153	36	81 %	0,569
2	Forestry and logging	80	62	18	78 %	0,609
5	Fishing, fish farming, incl. services	445	275	170	62 %	0,872
11	Oil and gas extraction, incl. serv.	28	14	14	50 %	1,208
14	Other mining and quarrying	141	87	54	62 %	0,713
15	Food products and beverages	558	370	188	66 %	0,648
17	Textile products	152	110	42	72 %	0,529
18	Wearing apparel., fur	48	34	14	71 %	0,563
19	Footwear and leather products	15	13	2	87 %	0,629
20	Wood and wood products	419	309	110	74 %	0,576
21	Pulp, paper and paper products	46	30	16	65 %	0,612
22	Publishing, printing, reproduction	918	611	307	67 %	0,595
23	Refined petroleum products	2	2	0	100 %	0,898
24	Chemicals and chemical products	61	42	19	69 %	0,763
25	Rubber and plastic products	151	101	50	67 %	0,576
26	Other non-metallic mineral products	210	139	71	66 %	0,631
27	Basic metals	42	17	25	40 %	0,591
28	Fabricated metal products	604	414	190	69 %	0,546
29	Machinery and equipment n.e.c.	503	329	174	65 %	0,645
30	Office machinery and computers	12	8	4	67 %	0,755
31	Electrical machinery and apparatus	152	96	56	63 %	0,658
32	Radio, TV sets, communication equip	34	13	21	38 %	0,753
33	Instruments, watches and clocks	163	115	48	71 %	0,611
34	Motor vehicles, trailers, semi-tr.	49	37	12	76 %	0,632
35	Other transport equipment	299	193	106	65 %	0,698
36	Furniture, manufacturing n.e.c.	307	233	74	76 %	0,552
37	Recycling	32	18	14	56 %	0,873
40	Electricity, gas and steam supply	35	13	22	37 %	0,770
41	Water supply	3	1	2	33 %	0,788
45	Construction	4,877	3,670	1,207	75 %	0,587
50	Motor vehicle services	2,137	1,648	489	77 %	0,510
51	Wholesale trade, commission trade	4,531	3,421	1,110	76 %	0,701
52	Retail trade, repair personal goods	5,882	4,850	1,032	82 %	0,494
55	Hotels and restaurants	1,512	1,127	385	75 %	0,559
60	Land transport, pipeline transport	1,187	1,010	177	85 %	0,545
61	Water transport	235	150	85	64 %	1,104
62	Air transport	12	7	5	58 %	0,905
63	Supporting transport activities	626	395	231	63 %	0,855
64	Post and telecommunications	72	42	30	58 %	0,833
65	Financial intermediation, less ins.	61	49	12	80 %	1,146
66	Insurance and pension funding	5	0	5	0 %	0,593
67	Auxiliary financial intermediation	170	110	60	65 %	0,876
70	Real estate activities	4,228	2,932	1,296	69 %	0,863
71	Renting of machinery and equipment	285	209	76	73 %	0,827
72	Computers and related activities	917	563	354	61 %	0,858
73	Research and development	36	17	19	47 %	0,879
74	Other business activities	6,063	4,490	1,573	74 %	0,788
80	Education	295	209	86	71 %	0,657
85	Health and social work	1,021	806	215	79 %	0,622
88	Unclassified	36	27	9	75 %	1,873
90	Sewage, refuse disposal activities	92	64	28	70 %	0,568
91	Membership organizations n.e.c.	12	5	7	42 %	0,675
92	Cultural and sporting activities	586	385	201	66 %	0,732
93	Other service activities	620	438	182	71 %	0,453
	TOTAL	41,196	30,463	10,733	74 %	0,729

Table 5: Number of firms in each industry, density of family firms and the associated industry risk proxy.

We see that density of family firms in the industries goes from zero percent in insurance and pension funding to 100 percent in refined petroleum products. However, these extreme densities have very few observations, and the rest of the industries have between 33 and 87 percent family firms. This is much higher and less dispersed than Villalonga and Amit (2006) found in their sample based on listed firms. We can test whether family firms are more inclined to choose industries with lower risk by regressing the density of family firms on the associated industry risk proxy.

OLS regression of density of family firms on industry risk

	Dependent variable: Density of family firms in industry
Industry risk proxy	-.043 (.654)
R^2	.004
N	54

Table 6: OLS regression of the density of family firms in each level 3 NAICS industry on our industry risk proxy. We report the non-standardized coefficient, with p-value in parenthesis.

The regression in Table 6 shows close to no explanatory power, and is highly insignificant. Thus, the data in our sample does not support the hypothesis that family firms are more inclined to choose lower-risk industries. Even though we are unable to establish a clear relationship between industry risk and density of family firms, it is still important to control for industry risk in our model because the distribution of family firms in each industry is not uniform.

Table 2 also shows the average fraction held by the largest family is 77 percent in our sample. This a little bit higher than Berzins et al. (2008) found in their sample. However, this is an expected effect from the survivorship bias in our sample, as family firms are more likely to survive filter 6. We also find that there is very high ownership concentration in family firms, with an average ultimate holding of the largest family of 91.8 percent, and a median of 100 percent. The average ultimate holding of largest family in non-family firms is 34.3 percent, with median of 34.6 percent. This shows that the ownership concentration is quite high even in non-family firms, indicating that families still have significant influence in non-family firms. With our definition of a family firm, we have 32,358 family firms, accounting for 74 percent of the sample, which is also slightly upward biased due to filter 6.

The descriptives in Table 2 shows higher cash flow from operations for family firms. It is interesting to notice that this is opposite from operating income, implying that family

firms generally have a lower level of costs. However, the difference is insignificant, and therefore not conclusive.

To recapitulate the descriptives of our sample; family firms appears to have lower operational volatility on average, yet they do not appear to choose industries with lower risk. They are of similar size measured by operating income, except for the very largest firms. They also tend to have higher return on assets, although the survivorship bias evens out the difference to some degree. There is no significant difference in financial leverage ratio or in cash flow from operations. Overall, the descriptive statistics does not seem to contradict our hypothesis that family firms tend to diversify more than non-family firms.

Regression results

Table 7 reports the results from our cross-sectional regressions, analyzing the relationship between family firms and diversification. Column 1 and 2 shows the results with the diversification proxy based on operating income for the years 2000 and 2005. Column 3 and 4 shows the result when using proxy based on cash flows from operations for the years 2000 and 2005. We look at the standardized coefficients in order to compare the impact of each variable with each other, as they have different units of measurement.

OLS regression with standardized coefficients using family firm dummy

	Dependent variable: Diversification proxy based on log of operating income		Dependent variable: Diversification proxy based on log of cash flow from operations	
	2000 (1)	2005 (2)	2000 (3)	2005 (4)
Family firm dummy	-.036 (.000)	-.047 (.000)	-.032 (.000)	-.031 (.000)
Log of company size	-.267 (.000)	-.220 (.000)	-.275 (.000)	-.352 (.000)
Financial leverage ratio	-.000 (.913)	.008 (.063)	-.008 (.066)	-.008 (.065)
Log of industry risk	.247 (.000)	.279 (.000)	.195 (.000)	.190 (.000)
R^2	.157	.148	.102	.145
N	51,368	43,635	47,541	41,396

Table 7: OLS regressions of our diversification proxies on firm classification, size, leverage and industry risk. Family ownership dummy equals one when one particular family has ultimate ownership above 50 percent. P-values are presented in parenthesis. We report standardized coefficients in order to determine which of the independent variables have greater impact on the diversification proxy, as the variables have different units of measurement.

We find a significant negative relationship between family ownership and our diversification proxy, supporting our hypothesis that family firms diversify more than

non-family firms. The coefficients of the family firm dummy appears to be fairly stable across time and type of diversification proxy, ranging from -.031 to -.047. As expected we find that company size has a significant negative relationship with volatility in operations, indicating that large firms generally have more stable revenues and cash flows. The coefficients appears to be fairly stable, ranging from -.220 to -.352. Industry risk has a significant positive influence on the volatility, confirming that the volatility of firms to a large extent follows the volatility of the industry it is operating in. The coefficients are fairly stable, ranging from .190 to .279. Financial leverage ratio, however, shows no clear relationship with the diversification proxy. The coefficients fluctuate from -.008 to .008 with no statistical significance at the five percent level.

The same analysis using fraction held by largest family instead of the family dummy, shows similar results. This suggests that the diversification is increasing with ownership concentration, and not just with the control threshold. We also see that the coefficients for family ownership slightly increase relative to the other variables, in all the regressions. This suggests that diversification is not a necessarily a decision made by the families once control is obtained, but rather a natural consequence of ownership interests as the ownership concentration increases and more of the controlling family's wealth goes into the firm.

OLS regression with standardized coefficients using fraction held by largest family

	Dependent variable: Diversification proxy based on log of operating income		Dependent variable: Diversification proxy based on log of cash flow from operations	
	2000	2005	2000	2005
Fraction held by largest family	-.042 (.000)	-.056 (.000)	-.039 (.000)	-.038 (.000)
Log of company size	-.269 (.000)	-.225 (.000)	-.277 (.000)	-.355 (.000)
Financial leverage ratio	-.000 (.914)	.000 (.062)	-.008 (.065)	-.008 (.064)
Log of industry risk	.244 (.000)	.276 (.000)	.194 (.000)	.189 (.000)
R^2	.158	.149	.103	.146
N	51,368	43,635	47,541	41,396

Table 8: OLS regressions of our diversification proxies on fraction held by largest family, size, leverage and industry risk. P-values are presented in parenthesis. We report standardized coefficients in order to determine which of the independent variables have greater impact on the diversification proxy, as the variables have different units of measurement.

By comparing the coefficients with each other we get a sense of the impact of the variables on the diversification proxy. The largest drivers of volatility in operations in our

model are company size and industry risk, which is reasonable. Although industry risk and company size has 4 to 11 times the impact of the family firm dummy, the influence from family ownership is still significant. This result suggests that the presence of family ownership does in fact have a substantial effect on the operational decisions made in the firms. Since we do not have observable market values for private firms, it is difficult to establish the cost of this excess diversification for the minority owners. However, the high ROA in family firms may imply that this diversification is less costly than the benefit from lower other agency costs in family firms.

Robustness tests

To check for multicollinearity problems, we have calculated the variance inflation factors (VIF) for all variables. All the VIF values are very low, and do not raise any concerns with multicollinearity. We have also performed analyses on the residuals from the regressions. We find no correlation of significance between the residuals and independent variables. To ensure that we can have a reasonable level of inference in the model, we check the distribution of the residuals.

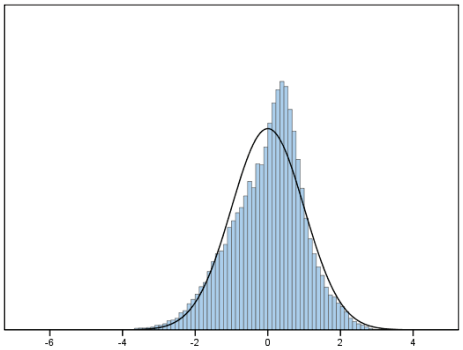

Figure 2: Standardized residuals distribution from the 2005 regression, using diversification proxy based on cash flow from operations

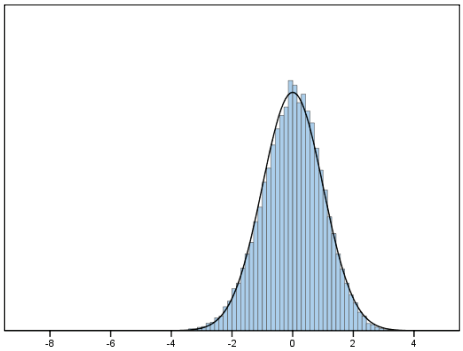

Figure 3: Standardized residuals distribution from the 2005 regression using diversification proxy based on operating income

The distribution of residuals from the regressions with the two different volatility measures shows that the residuals from the model using proxy based on cash flow from operations is somewhat skewed and leptokurtic. This is probably caused by our normalization procedure. The model specified with proxy based on operating income is very close to normally distributed. We are therefore most comfortable with the results based on operating income. Even so, both specifications give very similar results.

To check for robustness with other family control definitions, we run several regressions where we split the definition of family firms into separate control mechanisms. Table 9 shows that the results are very robust even with these alternative model specifications. However, this separation does not add any explanatory power to the model. It appears

that our original specification with a family firm dummy for largest ultimate family ownership above 50 percent captures most of the families' influence in the firms.

OLS regressions with alternative specifications for 2005

	(1)	(2)	(3)	(4)
Family firm dummy, super majority	-.039 (.000)			
Fraction held by largest family		-.033 (.000)	-.017 (.002)	.000 (.950)
Largest family has Chair		-.042 (.000)	-.037 (.000)	-.014 (.036)
Largest family has CEO			-.042 (.000)	-.035 (.000)
Largest family fraction of board				-.049 (.000)
Log of company size	-.218 (.000)	-.229 (.000)	-.230 (.000)	-.234 (.000)
Financial leverage ratio	.008 (.630)	.008 (.075)	.008 (.076)	-.008 (.078)
Log of industry risk	.279 (.000)	.275 (.000)	.275 (.000)	.273 (.000)
R^2	.148	.150	.152	.152
N	43,635	43,635	43,635	43,635

Table 9: OLS regressions with alternative specifications of family control. Dependent variable is our diversification proxy based on operating income for all regressions. Regression (1) use a family firm dummy based on super majority (66.67 percent). Regression (2), (3), (4) and (5) use fraction held by largest family, and various control mechanisms. P-values are presented in parenthesis. We report standardized coefficients.

Conclusion

In this paper we have investigated the presence of diversification in Norwegian family firms. After controlling for company size, industry risk and financial leverage ratio, we find that family firms have lower volatility in their operations than non-family firms. This supports our hypothesis that family firms diversify more than comparable non-family firms. Our results differ from what Villalonga and Amit (2006) found in their sample, however we use a diversification proxy which, in our opinion, is likely to better capture the effects from diversification. In addition our dataset is much more comprehensive, which enables us to use a more precise definition of family firms. We find no evidence, however, of family firms being more inclined to choose industries with lesser risk. Finally, our analysis shows that family firms survive longer than non-family firms, suggesting that they have longer investment horizons. Our findings seem to be robust both over time, with different diversification proxies, and alternative specifications.

Our results could be relevant for both conglomerate and agency theory. Like most of the previous research on the relationship between family firms and performance, we have found higher returns for family firms, measured in ROA. Put into the context of conglomerate discount theory, our findings may imply that the cost of diversification within companies is not as costly as commonly assumed. In the context of agency theory, it implies that the benefit from lower agency costs in family firms more than offsets the costs of diversification. This could therefore help explain the popularity of family firm as ownership structure.

However, an alternative interpretation of our results in a financial context could suggest that families with a large portion of their wealth invested in one firm, and thus high idiosyncratic risk, may impose their private required return on the firms' operational decisions. This may imply that family firms under invest by taking only the best projects (best return for risk), resulting in higher ROA, despite the fact that this probably is not optimal for more financially diversified minority owners in the firm.

Finally, from a governance perspective, the higher diversification in family firms could be that diversification facilitates funding possibilities (Tirole 2005, 158-160), without loss of control which is probably more important for family firms than non-family firms (Anderson and Reeb 2003).

Further research on family firms is needed to better understand the reasons behind this excess diversification. Regardless, our analysis finds evidence that family firms in Norway does make operational decisions to diversify more, that they tend to survive longer, yet they are not generally more inclined to choose industries with lesser risk than non-family firms.

Limitations

The primary limitation in our analysis is the quality of our diversification proxy. We only have 14 years of yearly data to compute the volatility in operations. We would have preferred more years and higher frequency of data, but this somewhat compensated by having a large number of companies to analyze. We also have to require a minimum number of yearly observations of operating income or cash flow from operations, which gives a survivorship bias in our sample. However, this bias is likely to even out some of the differences between family and non-family firms, which will deflate the significance of our model rather than inflate it. Thus, the bias should not reduce our ability of inference from the results.

The limitations of the data also prohibit us from running a time series regression, which could tell us more about the changes in diversification with changes in ownership structure. However, this is probably not a loss since there are empirically very little changes in ownership structure in private firms.

Finally, our diversification proxy captures only the volatility in operating income and cash flows from operations. There may be other types of behavior than diversification that impacts this volatility, like delaying innovation to reduce risk. We cannot isolate the diversification itself, but rather have to rely on the assumption that diversification is the main driver in our proxy.

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