Performance Drivers in Foundation-owned Firms

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Abstract

Foundation ownership – corporate ownership by foundations – is a common phenomenon in Northern Europe and particularly in Denmark. Foundation-owned companies have been found to perform well compared to companies with other ownership structures, but there are also large differences among the foundation-owned companies. We examine performance determinants within foundation-owned companies with a view to understanding what makes this unique ownership structure work. We find that the performance of foundation-owned firms is driven by firm size, consolidation, research and development activity, board independence and industry effects. Of these the positive effect of firm size and R&D activity are unique to foundation-owned firms.

1. Introduction

Foundation-ownership is a puzzle, because it seems to break some of the ground rules of modern governance such as profit incentives and risk diversification (Thomsen 1996). And yet it seems to work in the sense that foundation-owned companies do well on average in terms of profitability and other performance measures. But how it work? This is the question we seek to address in this paper.

Our approach is to examine performance variation among foundation-owned firms and to analyze the determinants of this variation. What makes for the success and failure of foundation-owned companies? How do they develop when they develop successfully and how when they are unsuccessful? What sets them on the path to failure or success? Clearly, like any other ownership structure, foundation ownership has its strengths and weaknesses and we would like to learn what we can about them. Furthermore it seems interesting to inquire whether the causes of success or failure differ for the factors that create failure or success in other companies.

The classic factors which have been emphasized in the literature on company performance include company size and industry, macroeconomic influences, investment strategies and R&D, governance variables and so on.

The paper is motivated both by a wish to understand foundation-ownership more deeply and by a search for management and governance principles that can assist managers and directors running foundation-owned companies. In particular, we are interested in whether good governance and management in foundation-owned companies is essentially the same as good governance in general or whether there are special rules of the game for foundation-owned companies.

It seems likely that the impact of industry and macroeconomic factors is essentially the same under foundation ownership as with other ownership structures such as family business or investor ownership. But is it the case that foundation-ownership is especially well suited for certain industries, for example those with high R&D intensity, high capital intensity or other special characteristics?

The performance effects of a standard variable like company size may also differ between foundation-owned companies and the rest. Company size appears not to be a strong performance driver for companies in general, but previous research has found that it is positively associated with performance in foundation-owned companies.

Other potentially important factors would relate to corporate governance.

Ownership could be an important variable. Foundations are characterized by attenuated profit motives, but what role does it play if managers, employees or the founding family co-own a minority share of the company? Will this effectively reinvigorate economic incentives, and is that even beneficial given that such mixed governance might weaken some of the strengths of foundation ownership. How about stock market listing? Could this strengthen governance and incentives in foundation-owned companies?

In the same way board and management variables might be important. Previous research has found that an appropriate level of independence between foundation and company boards might be associated with better performance. We check for the impact of these and other corporate governance variables in the following.

The paper is structured as follows. Section 2 outlines theoretical hypotheses. Section 3 describes data and design. Section 4 provides analysis. Section 5 concludes.

2. Theoretical Performance Drivers

Theoretically, there is reason to assume that foundation ownership attenuates the profit incentives of board members, which should all else equal lead to less monitoring and lower performance. Moreover, foundation-owned firms may be capital-rationed if they cannot tap into public equity markets, which should lead to lower growth and potentially also lower long-term profitability.

However, foundation ownership may also confer advantages on their companies that compensate or more than compensate for these drawbacks. For example, the long time horizon associated with foundation ownership (Børsting et al. 2014a) may be advantageous for R&D or capital intensive companies, if they are not capital rationed. In line with these expectations Hansmann and Thomsen (2011) show that listed foundation-owned companies do relatively better in research-intensive industries and if they are well consolidated (have high equity to asset ratios).

We therefore propose hypothesis 1 and 2.

H1. Foundation-owned firms do better in R&D and capital intensive industries.

H2. Foundation-owned firms do better if they are well consolidated (low debt/equity).

H3. We expect a positive interaction effect between low gearing and R&D/capital intensity.

The disadvantages of attenuated incentives may be more acute in small firms, where the owner-manager can monitor activities closely. In larger firms there is likely to be a loss of control from delegation and increasing complexity and from increasing separation of ownership and management through public listing or professional management. Børsting et al (2014) show that large foundation-owned companies do in fact perform better. We therefore propose hypothesis 4.

H4. Large foundation-owned firms do better.

Another key advantage of foundation ownership is orderly succession which is a critical issue in founder and family-owned firms. This would indicate that foundation ownership is relatively more favorable for older firms. However, Thomsen (1999) found the opposite: the profitability of foundation-owned firms decreases over time. He conjectured that this was attributable to dissipation of the founder legacy. Thus we propose hypothesis 5 for the sake of empirical testing

H5. Older foundation-owned firms do better.

In particular we expect a positive interaction effect on performance between firm age and foundation ownership.

Hansmann and Thomsen (2013) show that various components of what they call "managerial distance" appear to influence performance of foundation-owned firms. The idea is that foundation ownership works best if the owner (the foundation) and the company are managed separately. The distance measures proposed by Hansmann and Thomsen (2013) include: a limited overlap between foundation and company board, public listing, outside ownership, foundation ownership of other companies and charitable foundation goals. Hansmann and Thomsen show that these measures are correlated with profitability of the foundation-owned firms. They also show that founding family presence on the foundation board is associated with higher profitability.

Thus, we propose hypotheses 6-8.

H6. Foundation-owned companies with more than 2 foundation representative of the board will do worse.

H7. Listed foundation-owned firms do better

H8. Foundation-owned firms with personal minority shareholder do better.

3. Data and Measurement

The study is limited to incorporated firms in non-financial industries. The data for this study comes from six different registers. They are all based on mandatory information reported by corporations to the Danish Business Authority. First, we use the Danish Business Authority's register of 1,472 industrial foundations to identify the industrial foundations.

Second, there is firm ownership information. This allows identifying a list of firms that are owned by these industrial foundations. Also, we can identify the maximum ownership share of a given firm's different owners. The minimum ownership threshold for registration of firm ownership is 5 percent.

Third, there is accounting information from the firms' financial statements that they are obliged to submit to the Business Authority.

Fourth, there is firm background information (e.g. industry, legal form, firm name) from the authority's general firm register.

Fifth, there is information on person ownership of firms, as it is mandatory to report ownership stakes of at least five percent to the authority. The minimum ownership threshold for registration of person ownership is 5 percent.

All but the first of these registers are provided by the Danish branch of the business intelligence company Experian.

Sample

There is no information on the charters and main objectives of the foundations in the registers. So in order to remove a large share of foundations without business activity outside the foundations and foundations with charitable and government-linked activities (registered as industrial foundations), we clean the list by hand, and exclude foundations that run, e.g., museums, political newspapers, and social housing entities.

We then add data from the other registers with information on firm ownership (who owns the firm and who does the firm own), firm characteristics (e.g. year of incorporation, exit, and industry), firm management (directors and executives), and firm financials (income statement and balance sheet), respectively.

We use the ownership data to identify all subsidiaries of the industrial foundations. We also track subsidiaries of subsidiaries but not beyond that to subsidiaries of subsidiaroes, and we only consider firms incorporated in Denmark. Some foundations have a holding company in between the foundation and the subsidiary with the business activity. If a subsidiary is a holding company and a subsidiary of this company is also a holding company, it is removed from the data. We use Statistics Denmark's industrial classification "Dansk Branchekode" to identify holding companies. If a subsidiary is a holding company and the business activity is a subsidiary to that company, we drop the holding company but keep its subsidiary (the operating company).

The links between foundations and subsidiaries are made irrespective of ownership stakes, i.e. as long as a foundation owns part of a company the company included as a subsidiary.

Having established the links between foundations and operating companies, we add firm characteristics to the latter, and exclude all financial firms, since these firms are regulated by their own (different) law, and their income statements as well as balance sheets are incomparable to those of non-financial firms.

This leaves us with 414 different fofs over the period 2000-2014. Of these, we select all 305 firms that are present in the data in both in 2008 and 2012, and categorize these firms by three performance categories. Categorization is as follows:

We select the three performance variables (1) return on assets in 2012, (2) growth in annual earnings and (3) growth in total assets over the period 2008-2012. For each of these variables, each given firm is assigned a value of one to three - depending on the tertile of the distribution in which we find the given firm's variable's realization. For annual earnings growth, firms with negative annual earnings in 2012 are assigned the value 1 for this variable.

Summing up the values for the three performance variables generates a performance index with values from one to nine, which is used to categorize firms in the following three categories:

(1) LOW: if the performance index is less or equal to 4. These are firms in the lowest tertiles in all three variables, or in the lowest tertile for two and in the medium tertile in the third variable.
(2) MEDIUM: if the performance index is between 5 and 7.
(3) HIGH: if the performance index is at least 8.

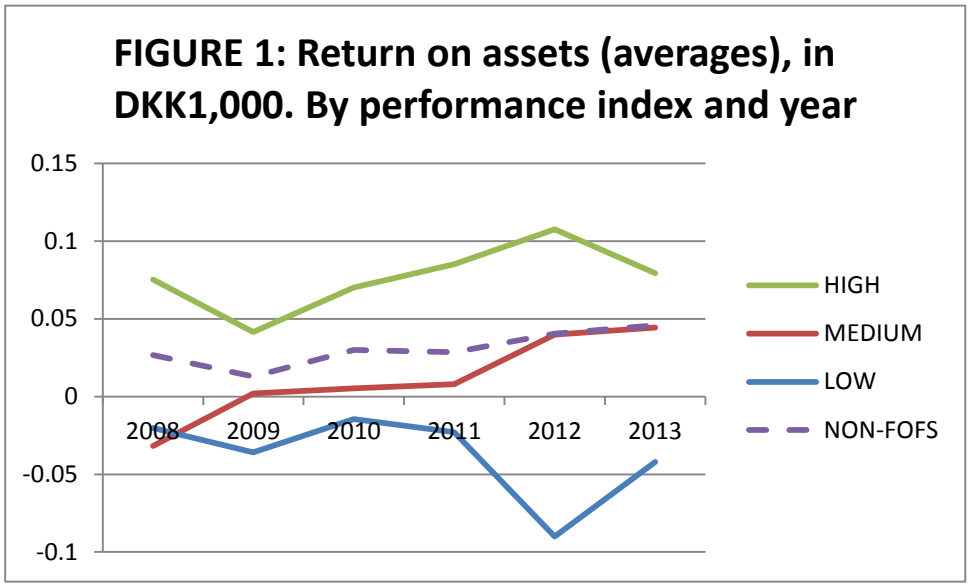
Basing performance on more than one variable has the advantage of reducing noise induced by single performance variables, and reduces the problem of firms substituting different performance variables for each other (e.g., low growth against high return on assets).

The three categorizations are also defining a category variable which we will call " "1-2-3Performance", and which will assume the values 1 to 3, with one being LOW performance firms, 2 being MEDIUM performance firms, and 3 being HIGH performance.

The 10 largest companies in each performance group are shown in Appendix A.

4. Results

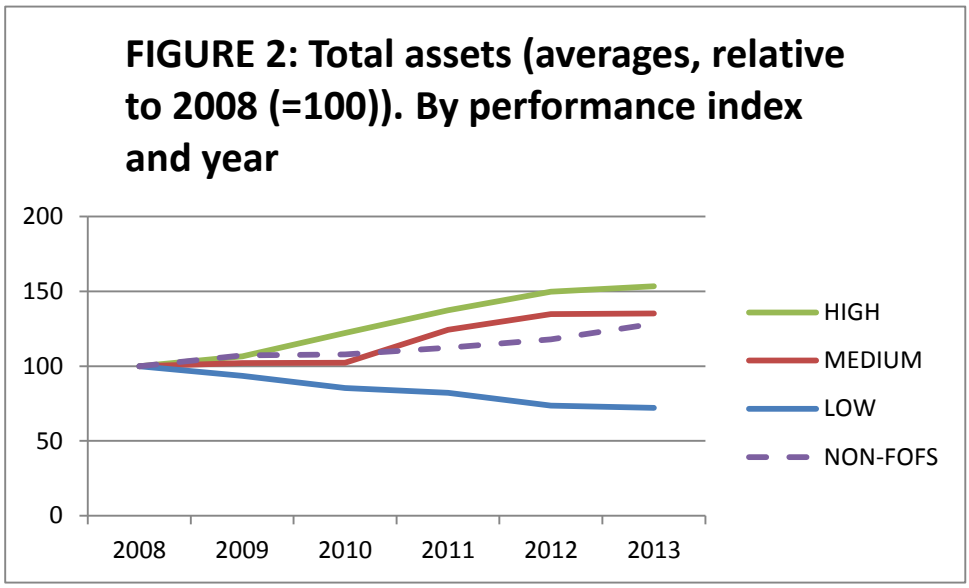
We begin by considering the evolution over time of the 3 performance groups (high, medium and low performers). Figure 1 plots average ROA – return on assets for each group.



We see that high-performing foundation-owned companies have ROAs of 5-10 and closer to 10% at the end of the period. In contrast medium performers ontain 0-5% ROA while low performers have negative values, generally in the order of 0 to -5%.

Both the medium and low performers tend to have lower ROA than the average (non-foundation owned) firms, but the medium group catch up during the period.

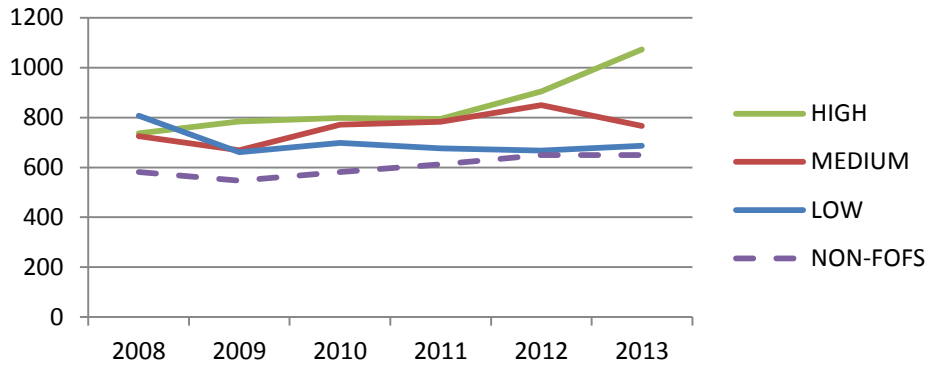
In terms of company size (assets, figure 2) successful foundation owned firms increase their scale by 50% over the 5 year period, while medium performers grow by nearly as much. In contrast low performance group lose 25% of their assets over the period.



This may be compared to a somewhat lower expansion of non foundation-owned firms of perhaps 30%.

Finally, we examine labor productivity (value added by employee), which increased by 50% in the high performance group but hardy moved in the other two categories.

FIGURE 3: Labour productivity (averages), in DKK1,000. By performance index and year



Performance analysis

First we examine the average performance differences in table 1.

By construction the high performers have higher average ROA (6.8%) than the medium performers (ROA around 0) while the low performance have negative ROA (-3.5%) over the 2008-2013 period. The high-performers have seen little change during the period, they were already high performers in 2008 (average ROA of 7.1). The medium performers had strongly negative ROA in 2008, but managed to improve up to 4 % at the end of the period, while the low performers went from -2.8 to -8.8% ROA in 2012.

However, other performance measures do not necessarily fall neatly into the same categories. It is striking, for example, that both the low and medium group have seen declines in absolute earnings.

Moreover, it is noticeable that the high-performance group does not on average have higher labor productivity or growth in labor productivity. In fact without correcting for outliers, the high-performers have lower labor productivity. We speculate that they may have expanded more internationally where wage costs per employee are smaller.

The low performers have cut jobs during the crisis, but both the medium and high performers have expanded their employment. It is obvious that the high-performers are much larger, and we will comment on this in the following.

TABLE 1

Characteristics of foundation owned firms. By performance category

Means. () =Standard deviation; []=Number of observations

	Performance category			Differences		
Variable	LOW (1)	MEDIUM (2)	HIGH (3)	HIGH-LOW (4)	HIGH-MEDIUM (5)	MEDIUM-LOW (6)
Return on assets; mean value 2008-2012 (winsorized)	-0.035	0.006	0.068	0.103***	0.062***	0.041***
	(0.085)	(0.104)	(0.117)	(0.018)	(0.012)	(0.012)
	[88]	[164]	[53]			
Increase in earnings; mean value 2008-2012 (winsorized)	-2,437	-393.621	1,367	3,805***	1,761***	2,044***
	(3,661)	(3,163)	(3,156)	(583.249)	(461.836)	(461.836)
	[88]	[164]	[53]			
Labour productivity; mean value 2008-2012 (winsorized)	805	784	847	41.926	63.642	-21.716
	(1,078)	(873.744)	(570.319)	(162.614)	(158.822)	(158.822)
	[65]	[104]	[38]			
Number of employees 2008	303	514	4,528	4,226	4,014	211
	(916.28)	(2,486)	(18,945)	(2,795)	(240.471)	(240.471)
	[74]	[133]	[46]			
Number of employees 2012	239	762	5,750	5,510	4,988*	523*
	(716.569)	(2,645)	(21,001)	(3,408)	(298.329)	(298.329)
	[54]	[88]	[38]			
Value added 2008	51,744	273,378	1,830,244	1,778,500	1,556,866**	221,634**
	(183,528)	(1,115,729)	(6,925,797)	(1,068,876)	(98,953)	(98,953)
	[78]	[133]	[42]			
Value added 2012	29,797	294,766	2,431,368	2,401,571	2,136,602**	264,969**
	(61,536)	(1,435,585)	(10,377,693)	(1,497,907)	(120,249)	(120,249)
	[79]	[143]	[48]			
Return on assets 2008 (winsorized)	-0.021	-0.037	0.071	0.092***	0.108	-0.016
	(0.114)	(0.213)	(0.163)	(0.026)	(0.021)	(0.021)
	[87]	[164]	[53]			
Return on assets 2012 (winsorized)	-0.088	0.04	0.108	0.196***	0.068***	0.128***
	(0.143)	(0.093)	(0.103)	(0.021)	(0.017)	(0.017)
	[88]	[164]	[53]			
Labour productivity: value added over number of employees 2008	1,497	982	737	-760.354	-244.678	-515.676
	(5,373)	(2,003)	(335.994)	(684.62)	(712.359)	(712.359)
	[62]	[96]	[37]			
Labour productivity: value added over number of employees 2012	1,391	1,239	908	-483.111	-331.62	-151.491
	(4,190)	(2,473)	(628.698)	(627.998)	(683.924)	(683.924)
	[46]	[71]	[31]			
Growth in total assets (pct) (winsorized); compound annual growth rate	1.215	1.67	2.172	0.957***	0.502**	0.455**
	(1.375)	(1.253)	(0.749)	(0.191)	(0.189)	(0.189)
	[73]	[157]	[53]			

Performance determinants

In table 2 we examine potential causes of these performance differences.

The most striking difference between the performance groups is that the high performers are on average much bigger companies. In fact, even at the beginning of the period in 2008 they were 10x the medium group which were 2x the low performers (in terms of assets).

Moreover, the fraction of undercapitalized firms with equity less than 20% of total assets was much lower among high performers than among low-performers. Apparently, consolidation is good for foundation-owned firms. This is understandable because of their long time horizons and their reluctance to give up control by issuing equity or taking large loans.

The high tech firms (with higher knowledge intensity) do better, which could indicate that foundation-owned firms have a comparative advantage in these sectors. We firm the same effect, though slightly weaker of R&D activity.

Ownership diversification and incorporation are also associated with higher subsequent performance.

As for negative factors, we find that family involvement - proxied by the number of board member with the same surname – appears to have a negative association with performance. Previous research (Thomsen 1999) has found that family involvement as such is positively or neutrally associated with performance, so the issue is not whether family involvement as such has a negative. The interpretation is rather that family dominance may have a negative effect.

A range of other factors such as board overlap or stock market listing appear to have little effect. The positive effect a large number of board members and executives is probably just a hidden company size effect.

TABLE 2

Characteristics of foundation owned firms. By performance category

Means. () =Standard deviation; []=Number of observations

	Performance category			Differences		
Variable	LOW (1)	MEDIUM (2)	HIGH (3)	HIGH-LOW (4)	HIGH-MEDIUM (5)	MEDIUM-LOW (6)
Total assets 2008	314,483	830,731	10,621,502	10,307,019	9,790,771*	516,248*
	(768,386)	(3,550,437)	(50,945,784)	(6,998,421)	(289,089)	(289,089)
	[88]	[164]	[53]			
Equity/total assets<0.2 2008	0.17	0.122	0.038	-0.132***	-0.084	-0.048
	(0.378)	(0.328)	(0.192)	(0.048)	(0.048)	(0.048)
	[88]	[164]	[53]			
In hightech industry	0.17	0.256	0.396	0.226***	0.14	0.086
	(0.378)	(0.438)	(0.494)	(0.079)	(0.053)	(0.053)
	[88]	[164]	[53]			
Number of board members with the same surname	1.625	1.494	1.302	-0.323***	-0.192	-0.131
	(0.875)	(0.847)	(0.54)	(0.119)	(0.114)	(0.114)
	[88]	[164]	[53]			
Number of registered owners (firms)	1.284	1.439	1.755	0.471**	0.316	0.155
	(0.883)	(1.131)	(1.329)	(0.205)	(0.129)	(0.129)
	[88]	[164]	[53]			
Squared number of registered owners (firms)	2.42	3.341	4.811	2.391*	1.47	0.921
	(6.896)	(8.063)	(8.209)	(1.346)	(0.968)	(0.968)
	[88]	[164]	[53]			
Average of majority owner ownership stake over time	77.615	78.531	71.828	-5.787	-6.703	0.916
	(30.247)	(26.905)	(32.157)	(5.469)	(3.848)	(3.848)
	[88]	[164]	[53]			
Is legal form ApS	0.136	0.165	0.019	-0.117***	-0.146	0.029
	(0.345)	(0.372)	(0.137)	(0.041)	(0.047)	(0.047)
	[88]	[164]	[53]			
There is at least one registered owner (person)	0.125	0.104	0.189	0.064	0.085	-0.021
	(0.333)	(0.306)	(0.395)	(0.065)	(0.043)	(0.043)
	[88]	[164]	[53]			
Capital intensity	24,913	16,922	32,680	7,767	15,758	-7,991
	(58,719)	(43,366)	(154,206)	(24,602)	(8,309)	(8,309)
	[66]	[112]	[43]			
The firm is publicly listed	0.023	0.049	0.075	0.052	0.026	0.026
	(0.15)	(0.216)	(0.267)	(0.04)	(0.023)	(0.023)
	[88]	[164]	[53]			
N persons managers or directors	6.068	5.951	7.34	1.272**	1.389	-0.117
	(3.169)	(2.997)	(3.803)	(0.622)	(0.411)	(0.411)
	[88]	[164]	[53]			
N top persons in top of owner firm	2.625	2.89	2.66	0.035	-0.23	0.265
	(2.013)	(2.262)	(1.829)	(0.33)	(0.278)	(0.278)
	[88]	[164]	[53]			
(0/1) Board member among firm owners	0.102	0.067	0.113	0.011	0.046	-0.035
	(0.305)	(0.251)	(0.32)	(0.055)	(0.038)	(0.038)
	[88]	[164]	[53]			
R&D activity 2008	0.023	0.043	0.113	0.09*	0.07	0.02
	(0.15)	(0.203)	(0.32)	(0.047)	(0.022)	(0.022)
	[88]	[164]	[53]			

Performance determinants in non-foundation-owned firms

To benchmark our results for foundation-owned firms we report similar results for non-foundation owned firms in table 3.

We observe a few striking differences.

First company size is not associated with better performance among firms in general. This appears to a distinctive feature among foundation-owned firms.

Secondly, R&D activity is not associated with better performance among firms in general. Apparently, the positive R&D effect is also a special feature of foundation ownership. This is consistent with previous research which indicates that foundation-owned firms may have special advantages

Third, there is a negative effect of capital intensity among firms in general, but his is not found among foundation-owned firms. This is also consistent with the hypothetical advantages of longtermism in foundation-owned firms.

Fourth, owner involvement on the company board is generally negatively associated with company performance, but not in foundation-owned firms. This could indicate that there are special advantages to foundation involvement on company boards.

TABLE 3

Characteristics of non-foundation owned firms. By performance category

Means. () =Standard deviation; []=Number of observations

	Performance category			Differences		
Variable	LOW (1)	MEDIUM (2)	HIGH (3)	HIGH-LOW (4)	HIGH-MEDIUM (5)	MEDIUM-LOW (6)
Total assets 2008	91,426	75,107	63,055	-28,371	-12,052	-16,319
	(2,306,840)	(1,422,249)	(728,948)	(22,893)	(23,573)	(23,573)
	[11,571]	[21,115]	[8,279]			
Equity/total assets<0.2 2008	0.275	0.244	0.166	-0.109***	-0.078***	-0.031***
	(0.447)	(0.43)	(0.372)	(0.006)	(0.005)	(0.005)
	[11,571]	[21,115]	[8,291]			
In hightech industry	0.273	0.308	0.362	0.089***	0.054***	0.035***
	(0.446)	(0.462)	(0.481)	(0.007)	(0.005)	(0.005)
	[11,571]	[21,115]	[8,291]			
Number of board members with the same surname	1.532	1.5	1.487	-0.045***	-0.013***	-0.032***
	(0.835)	(0.823)	(0.805)	(0.012)	(0.01)	(0.01)
	[11,571]	[21,115]	[8,291]			
Number of registered owners (firms)	0.716	0.753	0.847	0.131***	0.094***	0.037***
	(0.889)	(0.899)	(0.942)	(0.013)	(0.01)	(0.01)
	[11,571]	[21,115]	[8,291]			
Squared number of registered owners (firms)	1.302	1.375	1.604	0.302***	0.229	0.073
	(5.176)	(4.075)	(6.568)	(0.087)	(0.056)	(0.056)
	[11,571]	[21,115]	[8,291]			
Average of majority owner ownership stake over time	41.375	41.832	45.767	4.392***	3.935	0.457
	(40.677)	(39.851)	(38.982)	(0.571)	(0.467)	(0.467)
	[11,571]	[21,115]	[8,291]			
Is legal form ApS	0.558	0.578	0.557	-0.001	-0.021***	0.02***
	(0.497)	(0.494)	(0.497)	(0.007)	(0.006)	(0.006)
	[11,571]	[21,115]	[8,291]			
There is at least one registered owner (person)	0.46	0.447	0.409	-0.051***	-0.038**	-0.013**
	(0.498)	(0.497)	(0.492)	(0.007)	(0.006)	(0.006)
	[11,571]	[21,115]	[8,291]			
Capital intensity	5,946	6,132	3,746	-2199.413**	-2385.866	186.453
	(28,822)	(95,509)	(71,120)	(1,083)	(981.836)	(981.836)
	[6,162]	[11,001]	[4,869]			
The firm is publicly listed	0.003	0.002	0.002	-0.001	0**	-0.001**
	(0.056)	(0.043)	(0.045)	(0.001)	(0.001)	(0.001)
	[11,571]	[21,115]	[8,291]			
N persons managers or directors	2.815	2.743	2.852	0.037	0.109***	-0.072***
	(2.037)	(2.008)	(2.044)	(0.029)	(0.023)	(0.023)
	[11,571]	[21,115]	[8,291]			
N top persons in top of owner firm	0.78	0.79	0.845	0.065***	0.055	0.01
	(1.306)	(1.335)	(1.33)	(0.019)	(0.015)	(0.015)
	[11,571]	[21,115]	[8,291]			
(0/1) Board member among firm owners	0.409	0.401	0.369	-0.04***	-0.032	-0.008
	(0.492)	(0.49)	(0.483)	(0.007)	(0.006)	(0.006)
	[11,571]	[21,115]	[8,291]			
R&D activity 2008	0.003	0.003	0.003	0.000	0.000	0.000
	(0.05)	(0.051)	(0.05)	(0.001)	(0.001)	(0.001)
	[11,571]	[21,115]	[8,291]			

Analysis

In table 4 we present linear regression to estimate the simultaneous impact of the most important performance drivers in foundation-owned firms.

The most important performance drivers in foundation-owned firms appear to be company size (assets), consolidation, knowledge intensity, minority ownership and majority ownership share. Of the effect of company size is special to foundation-ownership.

Company performance in general appears to benefit from consolidation (avoiding high leverage), knowledge intensity, avoiding family dominance and ownership diversification. However, the effect of consolidation, ownership diversification and knowledge intensity appears to be numerically larger in foundation-owned firms.

TABLE 4: Linear regression results. Dependent variable: Performance index

	Foundation owned firms		Non-foundation owned firms	
	Model 1	Model 2	Model 1	Model 2:
Total assets, in billion DKK	0.003***	0.003***	-0.004***	-0.003***
	(0.001)	(0.001)	(0.001)	(0.001)
Equity share < 0.2	-0.313***	-0.317***	-0.148***	-0.150***
	(0.100)	(0.103)	(0.008)	(0.008)
In hightech industry	0.119	0.181*	0.100***	0.117***
	(0.096)	(0.109)	(0.008)	(0.009)
Number of board members with the same surname	-0.101**	-0.094**	-0.009*	-0.009**
	(0.044)	(0.046)	(0.005)	(0.005)
Number of registered owners (firms)	0.313***	0.327***	0.060***	0.059***
	(0.111)	(0.111)	(0.009)	(0.009)
Squared number of registered owners (firms)	-0.031**	-0.032**	-0.004***	-0.004***
	(0.014)	(0.014)	(0.002)	(0.002)
Average of majority owner ownership stake over time	0.004*	0.004**	0.001***	0.001***
	(0.002)	(0.002)	(0.000)	(0.000)
Is legal form ApS	-0.127	-0.159	0.041***	0.039***
	(0.097)	(0.104)	(0.008)	(0.008)
There is at least one registered owner (person)	0.165	0.193	0.003	0.002
	(0.131)	(0.133)	(0.011)	(0.011)
R&D activity	0.341*	0.344*	-0.075	-0.066
	(0.191)	(0.194)	(0.068)	(0.068)
Conditioned on industry (9 categories)	no	yes	no	yes
Observations	305	305	40,965	40,965
R-squared	0.102	0.129	0.017	0.019

Robust standard errors in parentheses. All explanatory variables measured in 2008.

**** p<0.01, ** p<0.05, * p<0.1*

5. Discussion

In this paper we have analyzed the determinants (drivers) of performance in foundation-owned firms. We used the 2008-2013 period because the crisis can be regarded as an exogenous shock that makes it easier to identify causal effects in a disequilibrium situation. In practical terms we can regard the crisis as a natural stress test of the performance of foundation-owned firms.

We find firstly that there are large performance differences among the foundation-owned firms. Some do substantially better than firms in general, others do substantially worse.

The most important special driver of foundation firm performance appears to be company size. Size in general is not associated with better performance. There are both costs and benefits. Large firms may benefit from economies of scale in operations, R&D, management and finance etc. But there are also costs in terms of bureaucracy and rigidity which have to be weighed against the advantages. These effects cancel out in the average firm.

However, in foundation-owned firms the positive size effect clearly dominates. There are several potential reasons for this.

First, the incentive advantage of personal ownership decline with firm size since decisions must increasingly be delegated to professional managers. The relative disadvantage of foundation ownership may therefore decline with size.

Secondly, the advantages of longermism may require a certain critical mass in terms of resources to manifest. Firm commitment is worthless if the firm does not have the resources to implement it, and it may therefore require a certain (industry specific) minimum efficient size to reap these benefits.

Third, foundations may slower to react to new circumstances, which may require a larger buffer in terms of equity and size to have sufficient time to react to new challenges.

We also note that relative advantage of foundation ownership in knowledge and capital intensive firms may be related to the firm size effects. R6d activity has a positive effect on the performance of foundation-owned firms, but not on firms in general. It is well known that there are economies of scale in R&D and knowledge since unit costs decrease with size and knowledge can be reused freely at zero or very low marginal cost.

Other factors like the negative effect of low consolidation or a positive effect of ownership diversification apply are common to both foundation-owned and firms in general.

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TABLE A.1: The largest five firms in terms of total assets (2008) in each performance index category

Performance index	Firm name	Total assets (DKK1,000) 2008	Total assets (DKK1,000) 2012	Return on assets 2008	Return on assets 2012	Annual earnings (DKK1,000) 2008	Annual earnings (DKK1,000) 2012
LOW:	MT Høgaard A/S	5,276,400	4,432,900	0.05	-0.12	259,000	-511,700
	Dalhoff Larsen & Horneman A/S	3,042,600	1,163,000	0.07	-0.17	226,600	-192,900
	A/S KFI-Holding	3,014,860	3,462,959	-0.04	-0.02	-109,296	-52,535
	Cowi A/S	2,387,444	2,607,034	0.05	-0.07	128,282	-171,714
	Claus Sørensen A/S	1,499,777	550,700	0.04	0.02	55,587	9,980
MEDIUM:	Danfoss A/S	32,900,000	27,800,000	0.00	0.08	-157,000	2,357,000
	LEO Pharma A/S	24,400,000	29,400,000	0.10	0.02	2,528,214	663,000
	H. Lundbeck A/S	12,600,000	21,600,000	0.12	0.05	1,509,600	1,107,000
	Aktieselskabet Schouw & Co.	10,200,000	10,400,000	-0.09	0.05	-903,400	468,800
	J. Lauritzen A/S	9,012,638	13,400,000	0.09	-0.15	788,923	-2,020,028
HIGH:	A.P. Møller - Mærsk A/S	343,000,000	421,000,000	0.05	0.06	17,600,000	23,400,000
	Carlsberg A/S	143,000,000	154,000,000	0.02	0.04	3,206,000	6,245,000
	Novo Nordisk A/S	50,600,000	65,700,000	0.19	0.33	9,645,000	21,400,000
	Novozymes A/S	9,925,000	15,100,000	0.11	0.13	1,062,000	2,016,000
	Hempel A/S	3,143,648	7,940,257	0.09	0.04	270,861	345,837