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Elite Directors and Firm Performance☆

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Abstract

This thesis investigates the effect elite board directors have on firm performance. With reference to the social networks associated with both board appointments and elite education, a director is designated as an elite director if he or she holds multiple directorships, or is educated at an elite university. Our results show that having directors with multiple directorships on the board has a negative impact on firm performance. These findings are in line with one strong flank of previous research, indicating that directors with multiple directorships are too busy to satisfactorily carry out their board duties. Furthermore, our results show no significant evidence of a correlation between directors holding elite educational degrees and firm performance.

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1 Introduction

The topic of board composition is a vibrant and vital part of the ongoing Swedish debate on corporate governance. The Swedish business press depicts the rather limited sphere of people holding multiple board appointments of large listed Swedish companies as a privileged and secluded community; often referred to as 'the Swedish board elite' (see for example Hedelius 2007).

Apart from the proportion of directors holding multiple directorships, another aspect of board composition is the educational backgrounds of the directors. This topic has been investigated in many US studies (see for example Useem and Karabel 1986). In these studies it has been shown that those educated at elite colleges are more likely than others to reach top corporate positions.

The above cited research and media debate on board composition, seem to point at the existence of a board elite. The purpose of this thesis is to investigate the effect that the members of the board elite have on firm performance. We choose to define an 'elite director' as a director who:

- holds multiple directorships, or
- is educated at an elite university or business school

Hence, we define the term 'elite' along two very different dimensions; presently being part of the elite corporate community, by holding multiple directorships, or being an elite director due to one's educational background.[1]

There have been few studies investigating the effect that directors holding multiple directorships have on firm performance. Core et al. (1999), as well as Shivdasani and Yermack (1999) argue that directors serving on multiple boards are too busy and thus unable to effectively monitor management. Furthermore, Fich and Shivdasani (2006) illustrate that firms with a majority of outside directors[2] holding three or more directorships, show inferior Market-to-Book ratios, worse profitability, and lower sensitivity of CEO turnover to firm performance. However, in a different study by Ferris et al. (2003), the authors find no evidence that directors with multiple board appointments have a negative impact on firm

[1] Of course, there are other possible definitions of an elite director. For one, the past professional career of a director might be characterized as being elite or not. For example, a director who has previously been a CEO of a large listed company could be said to be more elite than others. However, due practical restrictions in data availability and a general necessity of limiting the elite aspects under investigation, we have settled on the above definition. For a discussion on elite education, please refer to section 3.

[2] The terms 'outside director' and 'outsider' are used interchangeably. Please refer to Appendix D for a precise definition of the term outside director/outsider.

performance. Evidently, the empirical evidence and research on multiple directorships is ambiguous.

Alongside, studies of whether CEOs or directors with strong educational backgrounds improve firm performance are, to our knowledge, non-existing. However, there are several studies investigating how educational background affects the likelihood of becoming part of top corporate management. Some scholars, including Pierson (1969), distinguish between elite and non-elite colleges and find that elite college backgrounds are clearly over-represented in the utter US top management. This view is strengthened by the findings of Useem and Karabel (1986) who find that corporate top positions are more often reached when the candidate possesses a university degree from a top-ranked educational institution. On a related subject, Kramarz and Thesmar (2004) take a close look at the social networks prevailing within the community of French directors. The authors find that social networks, including educational backgrounds from French elite universities, strongly affect board composition. They also show that CEOs belonging to a certain network are more likely to accumulate directorships even if their own firms perform badly. Consequently, they argue that some social networks impair board effectiveness and thus may *indirectly* hurt firm performance.

To our knowledge there has been no previous study, investigating both the impact of directors' multiple directorships as well as their educational backgrounds on firm performance. We add to the studies by Fich and Shivdasani (2006) and Ferris et al. (2003) by investigating the effect of the directors' educational backgrounds on firm performance. Furthermore, rather than solely applying the principal agent perspective, we introduce sociological theories for analyzing multiple directorships. We also add to the study by Useem and Karabel (1986), by investigating whether the directors with elite educational backgrounds, who have reached corporate top positions, improve firm performance. Finally, we add to the study of Kramarz and Thesmar (2004) by checking *directly* what effect educational networks have on firm performance and by also investigating the effect that multiple directorships have on firm performance.

Our investigation is based on hand-collected data on the directorships held by some five hundred directors in 2003 and 2004 on the boards of Sweden's largest listed companies. This data has then been complemented with the educational backgrounds of these same directors. In the pursuit of mapping the informal social networks associated with education, tapped by each individual director, we have decided to focus solely on university education. More detailed background data, such as professional history and memberships in social networks/clubs, is in most cases not made available by the respective corporate or organizational entities. Unsuccessful efforts to gain access to membership data of certain social networks that would have been of interest for our investigations (e.g. The Swedish Army Language School[3]), have been made on our behalf.

Moreover, regarding the directors' board appointments, we have restricted ourselves to analyze the appointments on the boards of listed Swedish companies. The two years of investigation, 2003 and 2004, were chosen with the ambition to find a period of time, after the turbulent peak year of 2000, that was economically stable. This is a prerequisite to ensure reliable measurements of firm performance.

The remainder of this thesis is structured as follows. In section 2, we present the theoretical foundation and outline our hypotheses. This is followed by section 3, on methodology, where we define the utilized variables and outline our regression models. Subsequently, section 4 describes our data set, and comments on the data gathering procedure. Next, section 5 contains both a general presentation and an analysis of our results. Finally, in section 6, we present our conclusions and give suggestions for further research.

[3] Försvarets Tolkskola.

2 Theoretical Foundation and Hypotheses

The theories presented below relate to both corporate finance and sociology. They are used as tools for outlining our hypotheses, testing the effect that elite directors, i.e. directors holding multiple directorships, or educated at elite universities, have on firm performance.

2.1 The Principal Agent Theory and the Monitoring Role of the Board

The principal agent problem in corporations stems from the separation of ownership and control. This separation creates information asymmetries, often leading to problems of moral hazard. Since the principal and the agent can be assumed to have different personal objectives, there is an apparent risk that a manager will deviate from the shareholder goal of maximizing firm value. This issue results in high agency costs due to the necessity of monitoring managers. Since the ownership of a company is often dispersed, shareholders cannot themselves monitor the management and force it to act in a way that maximizes company value (Ross 1973, Jensen and Meckling 1976, Fama 1980, and Fama and Jensen 1983). Along the essence of the principal agent theory, Core et al. (1999), as well as Shivdasani and Yermack (1999) argue that boards with a high ratio of directors holding multiple directorships are too busy to carry out satisfactory monitoring, consequently having a negative impact on firm performance.

2.2 The Advisory Role of the Board

Whereas the principal agent theory looks at the directors of the board as tools for monitoring, they also act as advisors to the CEO. In its advisory role, the board draws upon the expertise of its members to help the CEO make strategic decisions that maximize the value of the company (Adams and Ferreira 2007).

2.3 Advantages of Having Social and Human Capital among Directors

Corporate and sociological literature contain rather extensive research analyzing what individual traits that foster corporate success. Inter alia, this research bears relevance for investigating the backgrounds of corporate directors. Becker’s (1975) work regarding income return on education, has been widely applied to explain who makes it to the upper sediments of corporate America. The research elaborates on the theory that persons well-endowed with human capital (i.e. IQ, educational background, and other similar tangible characteristics) have a high propensity for success inside the corporation they are active within (e.g. early promotion, higher bonuses, etc.). Furthermore, the concept of human capital also comprises elite education. Inter alia, Pierson (1969), as well as Useem and Karabel (1986) argue that a highly qualitative elite education helps a person become successful within a corporation.

Whereas human capital depicts the quality of individuals, social capital is the quality of the capital created between individuals (Coleman 1990, Bourdieu and Wacquant 1992, Burt 1992, Lin 1998). Social capital is commonly described in terms of different people's access to both formal and informal networks. It has been argued that each network circulates its own specific, and partly unique, flow of information. Consequently, the more networks a corporate agent has access to, the more social capital he or she possesses (Burt 1997).

However, Kramarz and Thesmar (2004) argue that access to social networks might have negative consequences. They provide evidence that CEOs of unsuccessful companies might gain board appointments solely by belonging to certain social networks. Consequently, suboptimal candidates may be promoted to the board of directors.

2.4 Hypotheses

To fulfill the purpose of this thesis, the following hypotheses, related to the effect of elite directors on firm performance, will be examined:

Hypothesis 1a: Directors holding multiple directorships impair firm performance.

In accordance with the principal agent theory it is reasonable to believe that directors holding multiple directorships are too busy to monitor the CEO. Furthermore, one can argue that directors holding multiple directorships are also too busy to carry out their advisory role. Hence, directors holding multiple directorships may be detrimental to firm performance.

Hypothesis 1b: Directors holding multiple directorships improve firm performance.

The literature on social capital suggests that boards with a high ratio of directors holding multiple directorships have access to more external corporate networks and hence hold a larger stock of social capital. One might then hypothesize that this stock of social capital, gained through multiple board appointments, would render in a valuable information advantage for the directors. This information advantage may result in improved board advisory and, in turn, superior corporate performance.

Hypothesis 2a: Directors educated at elite universities impair firm performance.

It has been shown that by providing directorships to CEOs of unsuccessful companies, the representation of certain social networks on boards might impair board effectiveness. Hence, it can be proposed that the educational background of a director might negatively influence firm performance.

Hypothesis 2b: Directors educated at elite universities improve firm performance.

Both in the light of social and human capital, it is of interest to analyze the educational backgrounds of a company's directors. Obviously, the educational background of a director provides one of his or her prime sources of human capital. According to the theories on human capital, a highly qualitative elite education should aid a person in becoming more successful within a corporation. In turn, it can be hypothesized that the increase in human capital, gained from the elite education, will improve the director's monitoring and advisory skills, subsequently affecting firm performance positively.

Furthermore, a director's elite education is most often closely attached to a social network. At the time of his or her studies, this network might be seen as one common entity with similar information reaching all network members. However, as time goes by and each elite student pursues an individual career, different professional networks, circulating unique information, are set up. In turn, the former educational network becomes a hub of access points to these new professional networks. Therefore, it can be proposed that the elite educational networks also constitute major pools of social capital. This social capital can improve the director's advisory qualities, and consequently, further improve firm performance.

Accordingly, we move to lift the application of the theories of human and social capital, previously employed on an individual level, to an aggregate company level. Thereby, we argue that human and social capital among directors, rather than solely helping the individual become successful, can also improve firm performance. This seems to be a reasonable extension as our study pertains individuals at the absolute top decision making layer of a company.

Summing up, hypotheses 1a and 2a together state that elite directors, i.e. directors holding multiple directorships, or educated at elite universities, impair firm performance. In contrast, hypotheses 1b and 2b point to that elite directors improve firm performance.

3 Methodology

In order to test the hypotheses, two sets of regressions are performed. In the first set, the effect of directors holding multiple directorships on firm performance is tested. Explanatory variables for these regressions are described in section 3.1.1. Subsequently, in the second set, the effect of elite education among directors on firm performance is tested. Explanatory variables for these regressions are described in section 3.1.2.

The explanatory variables used to describe board characteristics are calculated with regard to outside directors.[4] This means that it is not taken into account if insiders[5] have multiple directorships or what type of education they have. These insiders include the CEO, if he or she is on the board, as well as the workers' representatives. The reason for not labeling the CEO an outsider, is that he or she is to be monitored and advised, as opposed to the outsiders who are supposed to execute the monitoring and advising. Not including workers' representatives is in line with the study by Fich and Shivdasani (2006), making comparisons between the studies easier.

It should also be mentioned that the explanatory variables are measured at the beginnings of the two investigated years while the dependent variables, relating to firm performance, are measured at the ends of the same two years. The reason for this is that it is reasonable to believe that the explanatory variables have an impact on firm performance throughout the entire year.

Furthermore, since the two sets of regressions both try to explain firm performance, they will have the same dependent variables as well as control variables, except for *Percent Outsiders with University Degree*, which is only applied as a control variable in the elite educational regressions.

3.1 Explanatory Variables[6]

3.1.1 Multiple Directorships and Firm Performance

In order to test hypotheses 1a and 1b, the following explanatory variables are used:

Average Directorships per Outsider

Measuring the average number of directorships held by the outsiders of each firm is one commonly practiced way of measuring the prevalence of multiple directorships on a board.

[4] Notably, one of our control variables, *Board Member Average Ownership*, is calculated including the CEO. Please refer to section 3.3 for a precise definition.

[5] Board members who are full-time employees of the firm.

[6] Please refer to Appendix D for exact formulas and definitions of all explanatory variables.

Percent Busy Outsiders

This variable is an alternative measure of the occurrence of multiple directorships, measuring the proportion of outsiders who are, what we refer to as, busy. An outsider is labeled busy if he or she holds more than three directorships. The cut-off point of three directorships is chosen since it is in line with what has been practice in previous research, most notably Ferris et al. (2003) and Fich and Shivdasani (2006).

When counting the directorships held by each individual outsider, board appointments in foreign corporations, non-profit organizations, or private firms are not included. Thus, the counted directorships are only the ones held on the board of other companies listed on the Stockholm Stock Exchange in 2003-2004. Moreover, the measures on multiple directorships do not take into account other, non-board related, assignments for corporate or non-profit organizations. It should also be pointed out that the directorships counted are not limited to the companies in the investigated sample, but rather include all directorships held on the A, O and NGM lists of the Stockholm Stock Exchange.

To measure the presence of multiple directorships on a board in an appropriate manner is central to our testing. Therefore, the regressions are run individually with the two different explanatory variables described above. The reason is that they capture two different aspects of boards comprising directors with multiple directorships. A good example of this difference between the measures can be seen when comparing Ericsson and Investor. In 2003, the *Average Number of Directorships* held by the outside directors was 3.3 for Ericsson, and 2.8 for Investor. At the same time the *Percent Busy Outsiders* was 37.5 percent for Ericsson but 55.6 percent for Investor.[7] Thus, while the outside directors of Ericsson seem busier than those of Investor at the aggregate level, having a higher number of average directorships, the busyness of the Ericsson board can largely be attributed to a few directors, shown by the lower proportion of busy directors.

All regressions are performed twice; once with explanatory variables measured including foreign outside directors,[8] and once excluding them. The reason for this is that we only count directorships held on the boards of listed Swedish companies. Hence, the measurements of multiple directorships including foreign outside directors might be biased since they do not take into account the directorships held by these directors in other countries.

[7] All numbers including foreign directors. In 2003, the board size of Ericsson was 12 members and the board size of Investor was 11 members.

[8] The terms 'foreign outside director', 'foreign outsider' and 'foreigner' are used interchangeably.

3.1.2 Elite Education and Firm Performance

In order to test hypotheses 2a and 2b, the following explanatory variables are used:

Percent Outsiders with SSE / RIT / Chalmers Degree

These are three variables measuring the proportion of outside directors holding an undergraduate degree from a Swedish elite college or university. The first variable measures the proportion of outsiders holding an undergraduate degree from the Stockholm School of Economics (SSE), while the other two variables measure the same ratio with regard to the Royal Institute of Technology (RIT) and Chalmers University (Chalmers). These variables are used to measure how large share of the outsiders of a firm are holding their undergraduate degrees from each of Sweden's three most prestigious universities.

It can be argued that other universities should have been included in the definition of elite universities, or that one or two of the selected ones should have been dropped. The definition is based on the fact that SSE, RIT and Chalmers grant their students Sweden's highest initial salaries after graduation (Dagens Industri 2005). Another indication of these three being Sweden's most well-renowned universities can be detected in the raw data, which shows that the majority of the CEOs of the largest companies hold their degrees from these three universities.

One might argue that we miss out on the outside directors who hold their undergraduate degrees from foreign elite universities. However, looking at the raw data, it can be concluded that the Swedish outside directors with a degree from a foreign university are not numerous.[9] Moreover, deciding which foreign universities are prestigious enough to be defined as elite universities would probably imply a rather subjective selection process.

Percent Outsiders with MBA Degree

This variable measures the proportion of outsiders holding an MBA degree. It can be argued that earning an MBA is a way to attain a particularly distinguished elite education. Hence, earning an MBA degree can affect a director positively through the elite education he or she attains (human capital), as well as through the network of fellow MBA students he or she builds up (social capital).

It could be proposed that the MBA variable should be divided into several variables, to separate MBA degrees from different educational institutions from each other. However, the

[9] The Swedish outside directors holding degrees from foreign universities constituted 1.19% of the total sample of directors in 2003 and in 2004 they constituted 1.16% in 2004.

data on what specific business schools the MBA degrees come from is relatively scarce.[10] Therefore we only use one aggregate MBA variable.

Percent Outsiders with Elite Degree

As a complement to the separate elite education variables outlined above, this aggregate elite education variable is also included. The variable measures the proportion of outsiders who hold either an undergraduate degree from one of the three Swedish elite universities, or alternatively, an MBA degree.

The variables described above are the ones used to investigate to what extent the board is made up of outsiders with elite educational backgrounds. As has already been discussed, other measures could of course have been relevant. For example, we intended to include a variable for the outside directors educated at the Swedish Army Language School, since it is known to be an elite institution, training and educating the most distinguished upper secondary students in Sweden (Amcoff 2005). However, the enrolment data is not made publicly available.

It should also be discussed whether it is wise to include the educational variables separately, like we have chosen to do. Another way is to grade the education variables with points according to which ones we believe contribute most to the aggregate skill of the board. This, in turn, would give an aggregate number of points for each board measuring how well educated it is. However, in order to be able to distinguish between the effects from the different variables, they are included separately. Furthermore, the problematic task of setting up a sound framework measuring the different educational variables against each other is avoided. It should, however, be noted that the variable *Percent Outsiders with Elite Degree* to some extent measures the aggregate skill of the board, with equal weight given to each elite education.

Lastly, the data sample contains several foreigners and it is unlikely that they have attended any of the three Swedish elite universities. Since the number of foreigners on each board varies significantly throughout the sample of companies,[11] including them in the education variables might have a distorting impact. To account for this, the regressions are

[10] For instance, in 2004 there are a total of 53 MBA degrees, among the total included 674 directorships on the boards of firms in the sample. For 21 of these we know the specific business school. The business school with the strongest representation in the sample is Wharton, with a total of five MBA degrees.

[11] Several companies in the sample have no foreigners on their boards. The company with the highest ratio of foreign directors is Scania with 46% foreigners in 2003.

performed with education variables including as well as excluding foreign outside directors.[12]

3.2 Dependent Variables[13]

The dependent variables used to measure firm performance are *Market-to-Book (M-to-B)*, measuring firm valuation, and *Return on Assets (ROA)*, measuring operative performance.

3.3 Control Variables[14]

Board Composition (% Outside Directors)

The *Board Composition* variable measures the proportion of board members that are true outside directors, i.e. not CEO and not workers' representatives. Thus, the variable controls for the effect that the strength of governance has on firm performance. Stronger governance should lead to better firm performance, implying a positive correlation between the proportion of outside directors and firm performance. This was found in a study by Fich and Shivdasani (2006).

Natural Log of Assets

This variable measures the size of the company. Many previous studies have found significant relationships between size and firm performance, making it an important firm feature to control for. Lundstrum (2003) found a negative relationship between size and firm performance, whereas Ferris et al. (2003) found a positive relationship between the two measures.

Average Ownership per Board Member

It has been shown that the more a CEO or a director owns of a company, the better the firm performs (see for example Morck et al. 1988). In our study, a diluted ownership measure, taking into account both outstanding options and convertibles, is applied. The ownership of the CEO, but not the ownership of the potential workers' representatives, is included. The reason for this is that the CEO often owns a significant stake in the company where he or she is employed, whereas this is not the case for the workers' representatives.[15] Controlling for

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[12] In 2003, 89 out of the total 667 directorships are held by foreign directors. In 2004, 103 out of the total 674 directorships are held by foreign directors.

[13] Please refer to Appendix D for exact formulas and definitions of the dependent variables.

[14] Please refer to Appendix D for exact formulas and definitions of the control variables.

[15] Since some companies have workers' representatives on the board, while others do not, including them might distort the calculation of the variable.

the effect that board ownership has on firm performance has been common in previous studies, including Fich and Shivdasani (2006) who found a positive relationship between the two variables.

Operating Margin

This variable is itself an operative measure of firm performance and therefore it is likely that it will have a positive impact on the other performance measures.[16] Several other studies have likewise controlled for the effect that *Operating Margin* has on other performance measures. These studies include, among others, Ferris et al. (2003), who found a positive relationship between *Operating Margin* and *M-to-B*.

Industry Dummies

Since the data sample is made up of companies serving in several different industries, there might be industry specific differences in what is regarded as benchmark performance. Therefore, industry dummies (based on ICB-codes[17]) are introduced to allow for these differences. The respective dummies take on a value of 1 if a firm belongs to a certain industry and 0 if it does not. In total, eight different industry dummies are utilized.[18] In all of the regressions, the Telecom dummy is utilized as the base case, as this industry has *ROA* and *M-to-B* close to the overall sample mean. In order to check the findings for robustness, all of the regressions are performed with, as well as without, industry dummies.

Percent Outsiders with University Degree

This variable measures the proportion of outsiders holding a university degree. In deciding what degrees are valid, we have chosen to accept any undergraduate degree. Further, we have chosen to regard any university or college[19] as valid. The variable is included as a control variable only in the elite educational regressions. If these regressions show a significant relationship between elite education and firm performance, this variable is necessary to isolate the impact attributable to the elite education, as oppose to university education in general.

[16] It will most certainly have a positive effect on *Return on Assets* since the Dupont-formula gives: ROA = Operating Margin x Sales/Assets.
[17] ICB = Industry Classification Benchmark.
[18] Please refer to Appendix B for a sample overview and industry classifications.
[19] As well as Swedish 'Högskola'.

3.4 Modeling

Since the data set used in this study is longitudinal[20] it is possible to use unobserved effects estimation methods, which would be able to correct for omitted variables. However, due to the relatively small size of the data sample[21] ordinary pooled OLS has to be used for the regressions. The most important drawback of this method is that it has to be assumed that the unobserved effects are uncorrelated with all explanatory variables. If this is not the case, then the pooled OLS method might produce inconsistent estimators of the explanatory variables' coefficients (Wooldridge 2003). In order to mitigate this problem, the models are estimated with several control variables. However, we acknowledge the fact that we may have explanatory variables which are correlated with the omitted variables. Therefore the regressions might not produce perfectly consistent estimates.

The models with explanatory variables as well as control variables are stated below.[22]

Multiple Directorships Model[23,24]

$$Peformance = \beta_1 + \beta_2 MD_{1/2} + \beta_3 PO + \beta_4 LA + \beta_5 O + \beta_6 OM + \beta_{7,8,\ldots,13} ID$$

Performance: Market-to-Book or Return on Assets

MD_1: Average Directorships per Outsider

MD_2: Percent Busy Outsiders

PO: Percent Outsiders on the Board

LA: Natural Log of Assets

O: Average Ownership per Board Member

OM: Operating Margin

ID: Industry Dummies

[20] Please refer to section 4 for further information about the data set.
[21] Please refer to section 4.1 for more information.
[22] All models will be estimated with and without industry dummies, as mentioned in section 3.
[23] Results from tests of the basic OLS assumptions for this model, can be found in Appendix E.
[24] In order to establish causality, in the course of the discussion in section 5.1, this model has been estimated in difference form in Appendix A.

Elite Education Model[25]

$$Peformance = \beta_1 + \beta_2 SSE + \beta_3 RIT + \beta_4 C + \beta_5 MBA + \beta_6 E + \beta_7 UD + \beta_8 PO + \beta_9 LA + \beta_{10} O + \beta_{11} OM + \beta_{12,13,...,18} ID$$

Performance: Market-to-Book or Return on Assets

SSE: Percent Outsiders with SSE Degree

RIT: Percent Outsiders with RIT Degree

C: Percent Outsiders with Chalmers Degree

MBA: Percent Outsiders with MBA Degree

E: Percent Outsiders with Elite Degree

UD: Percent Outsiders with University Degree

PO: Percent Outsiders on the Board

LA: Natural Log of Assets

O: Average Ownership per Board Member

OM: Operating Margin

ID: Industry Dummies

[25] Results from tests of the basic OLS assumptions for this model, can be found in Appendix E.

4 Sample and Data

4.1 Sample Selection and Data Gathering Procedure

Our sample consists of those firms listed on the Stockholm Stock Exchange in 2003 and 2004 with a market capital of at least SEK 1 billion, at the beginning of both years. A size criterion is used since it provides us with companies having stocks that are liquid enough to ensure reliable valuations. Further, since the large firms have a relatively high ratio of elite directors on their boards, focusing solely on investigating these firms also provides the necessary prerequisites for testing the hypotheses.[26] However, since it is not yet known whether a large proportion of elite directors affects firm performance positively or negatively, we argue that this criterion will not bias the results. On the other hand, since it is likely that elite directors are overrepresented in the sample, the probability of finding significant results, regardless of what they show, is increased.

The firms that have their main listing on another stock exchange are excluded since these companies tend to have a majority of non-Swedish directors, making them less relevant for our investigation. Firms that are de-listed during the investigation period are also excluded. Our initial selection criteria provide a preliminary sample of 176 observations for 88 companies across the two years.

The relevant financial data for each firm is downloaded from Datastream.[27] The data not available in Datastream, is gathered using the annual accounts of the respective firms. Data on market capital not available in Datastream is taken from the publications on the website of the OMX Group.[28]

For each firm, data on the directors of the board is gathered from the firm's annual accounts. Directors' names, years of birth, and equity ownerships are acquired. The ownership data not available in the annual accounts is instead obtained from the Swedish Financial Supervisory Authority (Finansinspektionen). In the end, after directly contacting the firms for which information about ownership is still missing, five firms have to be dropped due to unobtainable information.

For each director, the aggregate number of directorships, held on the board of other firms listed on the Stockholm Stock Exchange, are counted. This data is taken from the yearly published books called '*Directors and Auditors in Sweden's Listed Companies' (*Sundin and

[26] In 2003, out of the top 20 Swedish listed companies, ranked by the concentration of multiple directorships on their respective boards, only three are below our size-cut-off. In 2004, two were below the cut-off (Sundin and Sundqvist 2003, and Sundin and Sundqvist 2004).

[27] Using the Worldscope Database.

[28] OMX Group owns exchanges in the Nordic and Baltic region (including the Stockholm Stock Exchange), and develops and provides technology and services to companies in the securities industry. OMX Group website: http://ww.omxgroupg.com.

Sundqvist 2003, and Sundin and Sundqvist 2004). Summing up, the data gathering process provides a sample, for the regressions on multiple directorships, of 162 observations for 81 firms across 2003 and 2004.

Information about each director's education is also gathered. This information is taken from the annual reports or web sites of companies where the director is employed. To check whether the directors have undergraduate degrees from the Stockholm School of Economics, the Royal Institute of Technology or from Chalmers University, a full list of names is sent to the alumni association of each university, for matching against the alumni databases. Further, we directly contact the companies having employed directors for which educational information is still missing.

Summing up, the sample contains 501 directors for 2003 and 514 for 2004. We are unable to find sufficient educational background data for 46 directors in 2003, and 42 in 2004. We impose a limit on how much missing educational background data that is acceptable to still include a company in the final regression sample. The limit we set restricts us from including companies where information for more than one director is missing. This forces us to drop 10 companies from the sample. Summing up, the data gathering procedure provides a sample, for the elite education regressions, of 142 observations for 71 firms across 2003 and 2004.

4.2 Missing Data and Outliers

Except for the firms being dropped from the sample, due to reasons stated above in section 4.1, we also exclude outliers deviating more than three standard deviations from the mean, with regard to the dependent variables.[29,30]

4.3 Data Description

Looking at the descriptive statistics for the multiple directorships sample in Table I, it is notable that a Swedish outside director of a large corporation holds around two and a half directorships on average. This means that, according to the definition set up in section 3.1.1, the average director is not 'busy'. Obviously, this can also be seen looking at the *Percent of Busy Outsiders* measure, which is below 50 percent. It is notable that the measures of multiple directorships differ quite substantially when calculated with respectively without foreigners.

[29] Two companies were dropped on the basis of the outlier criterion; Q-Med with a ROA of 133% in 2003 and Anoto Group with a ROA of -39.9% in 2003. No companies were excluded on the basis of Market-to-Book.
[30] Please refer to Appendix F for a summary of dropped observations.

Moreover, we would like to point out the fact that the mean of the variable *Average Ownership per Board Member* has not been weighted with regard to company size. Consequently, due to the fact that board members of smaller companies often hold relatively large equity stakes, the mean of the *Average Ownership per Board Member* variable might seem conspicuously high. Finally, it should be noted that many variables show high standard deviations, which is probably due to the fact that the sample spans over several industries with different characteristics.

Table I: Descriptive Statistics; Multiple Directorships Sample

	2004		2003		Both Years	
	Mean / Median (StDev)		Mean / Median (StDev)		Mean / Median (StDev)	
Market-to-Book	2.6 / 2.1 (1.6)		2.4 / 1.8 (1.5)		2.5 / 2.0 (1.5)	
Return on Assets	11% / 9% (9%)		9% / 8% (8%)		9% / 8% (8%)	
Market Capital (millions of SEK)	28 678 / 6 343 (53 706)		23 525 / 5 774 (40 561)		26 101 / 6 165 (47 512)	
Operating Margin	19% / 12% (24%)		16% / 9% (21%)		18% / 10% (23%)	
Board Size	9.3 / 10.0 (2.1)		9.2 / 9.3 (2.2)		9.3 / 10.0 (2.1)	
Number of Outsiders	6.8 / 7.0 (1.4)		6.6 / 7.0 (1.5)		6.7 / 7.0 (1.4)	
Board Composition (% Outside Directors)	74% / 70% (12%)		73 / 70% (12.%)		73% / 70% (12%)	
Average Ownership per Board Member	1.5% / 0.1% (2.8%)		1.5% / 0.1% (2.8%)		1.5% 0.1% (2.8%)	
Average Directorships per Outsider	2.3 / 2.2 (0.9)	2.6 / 2.3 (1.0)	2.4 / 2.2 (0.8)	2.6 / 2.5 (1.0)	2.4 / 2.2 (0.8)	2.6 / 2.5 (1.0)
Percent Busy Outsiders	34% / 33% (23%)	40% / 40% (27%)	34% / 33% (22%)	40.% / 40% (27%)	34% / 33% (22%)	40% / 40% (27%)
Foreign Outsiders Included	Yes	No	Yes	No	Yes	No

The descriptive statistics for the elite education sample are displayed below in Table II. Looking at the descriptive data, approximately one fifth of the outside directors hold an undergraduate degree from SSE and one tenth of them hold one from RIT. One in twenty outside directors holds his or her undergraduate degree from Chalmers University. About one tenth of the outside directors hold an MBA degree.

Table II: Descriptive Statistics; Elite Education Sample

	2004		2003		Both Years	
	Mean / Median (StDev)		Mean / Median (StDev)		Mean / Median (StDev)	
Market-to-Book	2.6 / 2.1 (1.6)		2.4 / 1.8 (1.5)		2.5 / 1.9 (1.6)	
Return on Assets	11% / 9% (9%)		8./ 8% (8%)		9% / 8% (9%)	
Market Capital (millions of SEK)	32 106 / 9 772 (56 559)		26 341 / 6 283 (42 597)		29 224 / 8 308 (49 973)	
Operating Margin	19% / 12 % (23%)		16% 9% (20%)		17% / 10% (22%)	
Board Size	9.3 / 10.0 (2.1)		9.2 / 9.0 (2.2)		9.3 / 9.0 (2.1)	
Number of Outsiders	6.8 / 7.0 (1.4)		6.6 / 7.0 (1.5)		6.7 / 7.0 (1.5)	
Board Composition (% Outside Directors)	74% / 70% (11%)		72% / 70% (12%)		73% / 70% (11%)	
Average Ownership per Board Member	1.3% / 0.1% (2.7%)		1.4% / 0.1% (2.8%)		1.3% / 0.1% (2.7%)	
Percent Outsiders with University Degree	83% / 100% (18%)	81%/ 100% (18%)	83% / 100% (17%)	82% / 100% (17%)	83%/100% (17%)	82% / 100% (18%)
Percent Outsiders with SSE Degree	20% / 17% (16%)	23% / 20% (18%)	19% / 17% (16%)	22% / 20% (16%)	20% / 17% (16%)	22% / 20% (17%)
Percent Outsiders with RIT Degree	12% / 13% (13%)	14% / 13% (15%)	12% / 13 % (14%)	14% / 14% (15%)	12% / 13% (13%)	14% / 14% (15%)
Percent Outsiders with Chalmers Degree	4% / 0% (9%)	5% / 0% (10%)	4% / 7% (9%)	5% / 0% (9%)	4% / 0% (8%)	5% / 0% (10%)
Percent Outsiders with MBA Degree	10% / 0% (13%)	10% / 0% (15%)	9% / 0% (13%)	10% / 0% (15%)	10% / 0% (13%)	10% / 0% (15%)
Percent Outsiders with Elite Degree	34% / 33% (22%)	40% / 33% 25%	34% / 33% (21%)	40% / 40% (24%)	34% / 33% (22%)	40% / 40% (24%)
Foreign Outsiders Included	Yes	No	Yes	No	Yes	No

5 Results and Discussion

5.1 The Effect of Multiple Directorships on Firm Performance

Table III: Results from Multiple Directorships Regressions

Dependent variable	MtB	MtB	ROA	ROA	MtB	MtB	ROA	ROA
Average Directorships per Outsider	-0.270		-0.002		-0.235		-0.003	
	(0.029)**		(0.740)		(0.061)*		(0.674)	
Percent Busy Outsiders		-0.843		-0.005		-0.666		-0.007
		(0.104)		(0.857)		(0.140)		(0.765)
Board Composition (% Outside Directors)	0.877	0.881	-0.074	-0.074	0.995	0.975	-0.073	-0.073
	(0.417)	(0.418)	(0.222)	(0.222)	(0.359)	(0.371)	(0.230)	(0.228)
Natural Log of Assets	-0.213	-0.224	-0.010	-0.010	-0.190	-0.205	-0.010	-0.010
	(0.000)***	(0.001)***	(0.005)***	(0.005)***	(0.007)***	0.003***	(0.012)**	(0.010)***
Board Member Average Ownership	4.478	8.517	0.171	0.169	8.053	8.081	0.172	0.171
	(0.063)*	(0.063)*	(0.498)	(0.508)	(0.075)*	(0.076)*	(0.494)	(0.498)
Operating Margin	-1.720	-1.690	0.100	0.101	-1.794	-1.742	0.100	0.100
	(0.004)***	(0.005)***	(0.003)***	(0.003)***	(0.003)***	(0.004)***	(0.003)***	(0.003)***
Foreign Outsiders Included	Yes	Yes	Yes	Yes	No	No	No	No
Intercept	6.184	5.939	0.299	0.297	5.647	5.549	0.293	0.292
	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***
Adjusted R^2	0.165	0.153	0.108	0.108	0.158	0.151	0.109	0.108

*** Significance at the one percent level
** Significance at the five percent level
* Significance at the ten percent level

In this section we display and analyze the results from testing the hypotheses:

Hypothesis 1a: Directors holding multiple directorships impair firm performance.

Hypothesis 1b: Directors holding multiple directorships improve firm performance.

Looking at Table III above, displaying the results from the multiple directorships regressions, we first establish that we only have significant coefficients on the multiple directorships variables regressing them on *M-to-B*. Supporting hypothesis 1a, *Average Directorships per Outsider* proves to have negative impact on *M-to-B*. This result is valid at the five percent level with foreign outsiders included, and at the ten percent level when excluded. Furthermore, a negative impact from *Percent Busy Outsiders* proves to be close to significant on the ten percent level (with foreigners included). Across all of the regressions in the table above, neither the significance, nor the coefficients change much when foreigners are excluded.

The multiple directorships variables show no significant effect on *ROA*. One possible explanation for this is that *ROA* is an operative performance measure, whereas *M-to-B* is a valuation related measure. Therefore, one might argue that the impact which the long-term focused work of a board is able to emit on a valuation related measure, e.g. *M-to-B*, is likely to be higher than on an operative measure of a specific year, e.g. *ROA*. Moreover, our results are in line with the study by Fich and Shivdasani (2006) who also found their strongest results with regard to *M-to-B*.[31]

The negative correlation between *M-to-B* and multiple directorships indicates one, or both, of the following two things. Either, directors with multiple directorships are too busy to carry out their duties of monitoring and advising in a satisfactory manner, or there is a general practice of appointing directors already holding multiple directorships when companies are performing poorly, i.e. in turnaround situations. In essence, we are facing the issue of causality. After unsuccessful attempts to econometrically establish causality,[32] we are obliged to take a less numerical approach in dealing with this issue. In order to get first hand input on turnarounds of listed Nordic companies, we interviewed a practitioner at a Swedish activist investment fund, who has taken part in the turnarounds of Lindex, Intrum Justitia and Metso.[33] During the interview, it was held for highly unlikely that directors with multiple directorships would be appointed in turnaround situations. It was even argued that this would be a sign of both a mal-functioning nominating committee and an irresponsible director. Analyzing the measures of multiple directorships before and after the turnaround of Lindex, they lend support to the proposed direction of causality indicating that directors with multiple directorships impair firm performance.[34] Judging from the above, it seems likely that our results are in line with the work by Core et al. (1999), Shivdasani and Yermack (1999), and Fich and Shivdasani (2006), stating that directors with multiple directorships have a detrimental impact on firm performance.

Thus, we do not find a positive relationship between multiple directorships and firm performance, as proposed on the basis of social capital theory. Either the information advantage gained through the multiple directorships does not have a discernable impact on firm performance, or the information advantage is outweighed by other sources of unique information that directors without multiple directorships have. This implies that multiple

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[31] Please refer to Appendix B for further tests using ROA as the dependent variable, while separating 2003 and 2004.

[32] Please refer to Appendix A for econometric tests of causality.

[33] Please refer to Appendix A for quotes.

[34] In 2003 (before the turnaround was initiated): *Average Number of Directorships* (incl. foreigners): 1.8 and *Percent Busy Outsiders* (incl. foreigners): 20%.
In 2004 (after a new turnaround board was appointed): *Average Number of Directorships* (incl. foreigners): 1.3 and *Percent Busy Outsiders* (incl. foreigners): 0%

directorships do not render in better corporate governance. Rather it seems that the negative impact on firm performance, i.e. the argument formed on the basis of the principal agent theory, prevails.

Finally, we note that the adjusted R^2 measures span between 10 and 17 percent, which indicates that the explanatory power of the model is quite low. Furthermore, we notice that two of our control variables, *Operating Margin* and *Natural Log of Assets,* are significant at the one percent level and that the control variable *Average Ownership per Board Member,* is significant at the ten percent level, in a couple of regressions. However, the last control variable, *Board Composition*, turns out to be insignificant in all of our regressions. All of the control variables show the expected sign, except for *Operating Margin*, which shows a negative correlation to *M-to-B*. Taking only the above regressions into consideration, this anomaly stands out as quite puzzling. However, judging from Table IV, displaying the same regression results, but with industry dummies included, this unexpected negative correlation is reversed. Hence, we are confident in stating that this anomaly is caused by industry specific factors.

Table IV: Results from Multiple Directorships Regressions (incl. Industry Dummies)

Dependent variable	MtB	MtB	ROA	ROA	MtB	MtB	ROA	ROA
Average Directorships per Outsider	-0.220		0.002		-0.261		-0.004	
	(0.082)*		(0.759)		(0.025)**		(0.596)	
Percent Busy Outsiders		-0.508		0.015		-0.753		-0.011
		(0.297)		(0.587)		(0.079)*		(0.663)
Board Composition (% Outside Directors)	0.903	0.907	0.000	-0.001	1.084	1.106	0.004	0.004
	(0.426)	(0.427)	(0.999)	(0.987)	(0.338)	(0.333)	(0.954)	(0.817)
Natural Log of Assets	-0.067	-0.076	-0.002	-0.002	-0.021	-0.036	-0.001	-0.001
	(0.324)	(0.264)	(0.624)	(0.599)	(0.769)	(0.620)	(0.849)	(0.817)
Average Ownership per Board Member	5.172	5.049	0.120	0.104	5.045	5.104	0.140	0.142
	(0.213)	(0.232)	(0.613)	(0.238)	(0.220)	(0.219)	(0.551)	(0.548)
Operating Margin	0.059	0.109	0.220	0.220	0.124	0.192	0.220	0.221
	(0.932)	(0.876)	(0.000)***	(0.000)***	(0.857)	(0.783)	(0.000)***	(0.000)***
Basic Materials	0.066	0.033	0.250	0.024	0.018	0.034	0.027	0.027
	(0.324)	(0.967)	(0.582)	(0.604)	(0.982)	(0.966)	(0.548)	(0.545)
Industrials	1.004	0.985	0.016	0.015	1.009	1.039	0.019	0.019
	(0.164)	(0.176)	(0.691)	(0.717)	(0.160)	(0.151)	(0.648)	(0.640)
Consumer Goods	1.134	1.136	0.044	0.043	1.071	1.113	0.044	0.044
	(0.139)	(0.141)	(0.317)	(0.329)	(0.159)	(0.146)	(0.313)	(0.307)
Healthcare	0.830	0.837	0.027	0.027	0.757	0.773	0.025	0.025
	(0.308)	(0.308)	(0.567)	(0.562)	(0.350)	(0.343)	(0.591)	(0.588)
Consumer Services	2.259	2.245	0.075	0.075	2.261	2.264	0.076	0.076
	(0.003)***	(0.003)***	(0.076)*	(0.076)*	(0.002)***	(0.003)***	(0.073)*	(0.073)*
Financials	-0.041	-0.079	-0.074	-0.075	-0.165	-0.159	-0.074	-0.074
	(0.952)	(0.910)	(0.061)*	(0.059)*	(0.810)	(0.819)	(0.063)*	(0.063)*
Technology	2.112	2.107	0.019	0.018	2.136	2.142	0.021	0.021
	(0.008)***	(0.009)***	(0.668)	(0.687)	(0.007)***	(0.008)***	(0.637)	(0.636)
Foreign Outsiders Included	Yes	Yes	Yes	Yes	No	No	No	No
Intercept	2.455	2.268	0.074	0.078	1.769	1.591	0.066	0.063
	(0.183)	(0.222)	(0.481)	(0.457)	(0.339)	(0.401)	(0.533)	(0.559)
Adjusted R^2	0.312	0.301	0.247	0.248	0.321	0.312	0.248	0.248

*** Significance at the one percent level
** Significance at the five percent level
* Significance at the ten percent level

Including industry dummies, we see that the significance of *Percent Busy Outsiders* only appears without foreigners and that the significance of the variable *Average Directorships per Outsider* appears to be stronger without foreigners; the opposite of what was true in the regressions without industry dummies. Although the significances change slightly, the coefficients remain in the vicinity of the ones achieved without dummies. In the cases without foreigners, the effects from the multiple directorships variables on *M-to-B* prove to be both stronger and more significant. This second set of regressions constitutes a vital check of the robustness of our results, whereby we can conclude that our findings regarding multiple directorships are unlikely to be caused by industry specific factors. Thus, we have relatively robust findings pointing in the direction that multiple directorships impair firm performance.

Notably, many of our control variables are insignificant. To some extent, this is surprising, as one would believe the variable *Average Ownership per Board Member* to have a significant impact across all industries. On the other hand, it is less surprising that the effects from *Operating Margin* and *Natural Log of Assets* on *M-to-B* are industry dependent. However, as pointed out in the previous section, it is somewhat comforting that the control variables, even though in many cases insignificant, carry the expected signs. Furthermore, one should take note of the fact that including industry dummies improves the adjusted R^2 and thus, the explanatory power of the model. Moreover, the control variable *Operating Margin* is still significant at the one percent level, even with dummies. Finally, neither in this second set of regressions are the variables concerning the multiple directorships significant when regressed on *ROA*.[35]

In conclusion, our multiple directorships models show robustness and point in the direction of multiple board appointments having negative correlation to firm performance. Thus, judging from our attempts to establish causality it seems that directors with multiple directorships impair firm performance through unsatisfactory monitoring and advisory.

[35] Please refer to Appendix B for further tests using ROA as the dependent variable, while separating 2003 and 2004.

5.2 The Effect of Elite Education on Firm Performance

Table V: Results from Elite Education Regressions

Dependent variable	MtB	ROA	MtB	ROA
Percent Outsiders with SSE Degree	-3.665	-0.058	-3.598	-0.083
	(0.173)	(0.201)	(0.159)	(0.553)
Percent Outsiders with RIT Degree	-3.558	-0.037	-3.412	-0.058
	(0.160)	(0.789)	(0.161)	(0.662)
Percent Outsiders with Chalmers Degree	-3.520	0.060	-3.547	0.018
	(0.293)	(0.745)	(0.244)	(0.912)
Percent Outsiders with MBA Degree	-1.139	-0.011	-1.011	-0.015
	(0.272)	(0.848)	(0.256)	(0.754)
Percent Outsiders with Elite Degree	3.128	0.002	3.503	0.036
	(0.261)	(0.988)	(0.175)	(0.800)
Percent Outsiders with University Degree	-0.898	-0.058	-1.396	-0.133
	(0.269)	(0.201)	(0.077)*	(0.076)*
Board Composition (% Outside Directors)	-0.135	-0.133	0.052	-0.133
	(0.920)	(0.073)*	(0.969)	(0.070)*
Natural Log of Assets	-0.215	-0.011	-0.201	-0.010
	(0.005)***	(0.011)**	(0.006)***	(0.018)**
Average Ownership per Board Member	7.472	0.058	8.473	0.069
	(0.178)	(0.850)	(0.124)	(0.819)
Operating Margin	-1.381	0.136	-1.577	0.132
	(0.077)*	(0.002)***	(0.041)**	(0.002)***
Foreign Outsiders Included	Yes	Yes	No	No
Intercept	7.412	0.410	7.427	0.407
	(0.000)***	(0.000)***	(0.000)***	(0.000)***
Adjusted R^2	0.141	0.115	0.148	0.125

*** Significance at the one percent level
** Significance at the five percent level
* Significance at the ten percent level

In this section we display and analyze the results from testing the hypotheses:

Hypothesis 2a: Directors educated at elite universities impair firm performance.
Hypothesis 2b: Directors educated at elite universities improve firm performance.

Looking at the results from the elite education regressions displayed in Table V above, we firstly note that none of the variables attributable to the three Swedish elite universities, as well as *Percent Outsiders with MBA Degree* and *Percent Outsiders with Elite Degree*, show any significance. However, in general, the coefficients show a negative impact on *M-to-B* and *ROA*. For all elite related variables, the coefficients have a higher significance when regressed on *M-to-B*, than when regressed on *ROA*.[36] All our elite education variables being insignificant, it seems that the educational background of individual board members is a too diminishing aspect of board composition to have a discernable impact on overall corporate

[36] Please refer to Appendix B for further tests, separating 2003 and 2004.

governance, and subsequently on firm performance. The education of a board member does not seem to be an important enough factor to have an effect on the overall success of the company. Thus, it is not surprising to note the relatively low R^2 measures, spanning between 12 and 15 percent.

Also notable, without foreigners, we have a negative impact from *Percent Outsiders with University Degree* on firm performance. A possible explanation is that this negative correlation has been disproportionably augmented by excluding foreigners. In our sample, there are a number of entrepreneurial companies with extraordinary high *ROA* and *M-to-B* as well as low levels of university education among their board members.[37] These companies also have unusually low levels of the highly educated foreigners on their boards.[38,39] This might explain the fact that the variable *Percent Outsiders with University Degree* is significant only when foreigners are excluded. Hence, we move to suggest that, by excluding foreigners, the negative correlation has been disproportionably augmented.

As mentioned above, our results show that companies can not expect to experience positive performance effects from having directors holding elite degrees represented on their boards. However, these results do not conclusively reject the proposition that boards well-endowed with human and social capital show superior firm performance. More likely, the variables we have defined are not representing sources of human and social capital that have an impact on firm performance. An alternative source that might be proposed to have a more significant impact is a director's previous career, before his or her board appointment. For one, having had a prominent career, e.g. including a previous role as a CEO, might grant a director a greater pool of both social and human capital. Alternatively, it is likely that a director with extensive previous experience within the industry where he or she now holds a directorship, has a larger amount of relevant social and human capital. Thus, having relevant industry experience, rather than having an elite education, might have a greater effect on the impact a director is able have on firm performance.

[37] The four companies Clas Ohlson, H&M, Orc Software and Mekonomen fit this picture very well:

<u>Averages of 2003 and 2004</u>
Clas Ohlson: % of outsiders (incl. foreigners) with university degree: 22.5%; ROA:36.6%; MtB:7.00
H&M: % of outsiders (incl. foreigners) with university degree: 62.5%; ROA:42.8%; MtB:7.66
Orc Software: % of outsiders (incl. foreigners) with university degree: 54%; ROA:16.0%; MtB:4.6
Mekonomen: % of outsiders (incl. foreigners) with university degree: 33%; ROA:12.4%; MtB:3.73

These figures should be compared with the full *sample means*:
% of outsiders (incl. foreigners) with university degree: 83%; ROA: 9.4%; MtB: 2.5

[38] Orc Software, Mekonomen and Clas Ohlson have no foreigners on their respective boards. In 2003, H&M has 11% foreigners on their board and 10% in 2004. This should be compared to the overall sample mean of 13% foreigners in 2003 and 16% foreigners in 2004.

[39] The percent foreign outside directors with university degree is 92% in 2003 and 95% in 2004. This should be compared to the overall sample mean of 83% in both years.

Table VI: Results from Elite Education Regressions (incl. Industry Dummies)

Dependent variable	MtB	ROA	MtB	ROA
Percent Outsiders with SSE Degree	-1.402	0.108	-1.258	0.087
	(0.576)	(0.452)	(0.595)	(0.522)
Percent Outsiders with RIT Degree	-1.552	0.105	-1.613	0.081
	(0.503)	(0.425)	(0.466)	(0.527)
Percent Outsiders with Chalmers Degree	-2.133	0.172	-2.334	0.128
	(0.480)	(0.317)	(0.392)	(0.416)
Percent Outsiders with MBA Degree	-1.743	-0.057	-1.831	-0.059
	(0.086)*	(0.322)	(0.031)**	(0.222)
Percent Outsiders with Elite Degree	1.588	-0.113	1.764	-0.094
	(0.531)	(0.434)	(0.454)	(0.489)
Percent Outsiders with University Degree	-0.586	-0.050	-0.880	-0.056
	(0.426)	(0.237)	(0.216)	(0.174)
Board Composition (% Outside Directors)	0.856	-0.021	0.912	-0.023
	(0.524)	(0.788)	(0.489)	(0.759)
Natural Log of Assets	-0.530	-0.001	-0.043	-0.001
	(0.506)	(0.819)	(0.561)	(0.822)
Average Ownership per Board Member	6.948	0.204	7.197	0.169
	(0.161)	(0.470)	(0.139)	(0.544)
Operating Margin	0.218	0.243	0.213	0.245
	(0.789)	(0.000)***	0.791	(0.000)***
Basic Materials	0.103	0.033	0.214	0.036
	(0.909)	(0.522)	(0.810)	(0.479)
Industrials	1.351	0.029	1.507	0.035
	(0.088)*	(0.514)	(0.055)*	(0.440)
Consumer Goods	1.489	0.054	1.522	0.055
	(0.076)*	(0.261)	(0.061)*	(0.241)
Healthcare	1.087	0.036	1.133	0.036
	(0.209)	(0.468)	(0.186)	(0.469)
Consumer Services	3.021	0.103	3.176	0.106
	(0.000)***	(0.025)**	(0.000)*	(0.021)**
Financials	0.080	-0.072	0.121	-0.069
	(0.913)	(0.088)*	(0.867)	(0.101)
Technology	2.325	0.022	2.453	0.027
	(0.008)***	(0.649)	(0.005)***	(0.590)
Foreign Outsiders Included	Yes	Yes	No	No
Intercept	2.173	0.117	2.069	0.122
	(0.320)	(0.348)	(0.323)	(0.310)
Adjusted R^2	0.337	0.272	0.356	0.278

*** Significance at the one percent level

** Significance at the five percent level

* Significance at the ten percent level

Adding industry dummies to the regressions reshuffles the significances of the explanatory educational variables slightly. We also note that the signs of the coefficients of several elite education variables turn positive when regressed on *ROA*, making even harder to draw any conclusions about the effect of elite educated directors on firm performance. Moreover, the *Percent Outsiders with University Degree* variable is no longer significant, implying that the results found in the models without industry dummies were attributable to industry specific effects. Instead, the *Percent Outsiders with MBA* variable turns out to have significant impact on *M-to-B*, both with and without foreigners. Also in the case of these educational regressions, compared to the case without industry dummies, do the adjusted R^2 measures more than double.

Excluding foreigners, the negative effect from *Percent Outsiders with MBA Degree* on *M-to-B* is significant even at the five percent level. This finding stands out as quite unexpected. One possible explanation is that MBA degrees are more common on the boards of larger firms,[40] which may at the same time show lower valuations on a *M-to-B* basis. However, as we control for size in our regressions, one can note that this is not the case. Rather it is likely that this finding is spurious and stems from the relative smallness of the data sample.

Evidently, the results from our regressions do not support hypothesis 2a, stating that directors with elite education impair firm performance. We can neither find support for hypothesis 2b, stating that directors with elite education improve firm performance. Hence, having a board with a high ratio of board members holding elite educational degrees does not seem to matter for corporate governance, and in turn firm performance. It could be proposed that other factors, such as career history and industry experience, might be of higher importance here.

It is important to state that our results point towards a dichotomy in the way that the endowment of human and social capital works on an individual, respectively on a company level. As mentioned in section 2.3, there is plenty of research backing the correlation between the endowment of human and social capital, and individual success. However, our results show no proof of the proposed extension of this theory; that companies well-endowed with human and social capital (through its directors) would show better performance than others.

[40] The par-wise correlation between *Percent Outsiders with MBA Degree* and *Natural Log of Assets* is positive, as can be seen in Appendix E.

6 Conclusions and Final Remarks

Table VII: Summary of Hypotheses and Results

Hypothesis	Support found?
Hypothesis 1a: Directors holding multiple directorships impair firm performance.	Yes
Hypothesis 1b: Directors holding multiple directorships improve firm performance.	No
Hypothesis 2a: Directors educated at elite universities impair firm performance.	No
Hypothesis 2b: Directors educated at elite universities improve firm performance.	No

In our investigations, we have found no evidence backing hypotheses 1b or 2b, together stating that elite directors, i.e. directors holding multiple directorships, or educated at elite universities, improve firm performance. On the contrary, we have made discoveries that are to some extent pointing in the opposite direction (in line with hypotheses 1a and inconclusive between 2a and 2b):

- Negative correlation between multiple directorships[41] and firm performance.
- No significant correlation between elite education and firm performance.

Starting with the effect of multiple directorships on firm performance, our findings lend support to the argument proposing that directors with multiple directorships are too busy to carry out their duties as advisors and monitors. In this regard, together with the paper by Fich and Shivdasani (2006), our study constitutes the second independent study pointing in this direction. Thus, our results question the, today common, practice of appointing directors already holding multiple directorships.

Next, we address the effects of elite education. As shown, we have found no significant relationships between the elite education variables and firm performance. Most likely, this is due to the education of a director not being an aspect important enough to affect corporate governance, and therefore also unable to affect firm performance.

As previously discussed, the theories of social and human capital are well-documented in the sense that personal success within corporations is correlated with the level of education in general, and elite education in particular. Nevertheless, our results provide no backing for the suggested extended theories of both human and social capital improving performance on a company level. In all likelihood, access to numerous and non-overlapping

[41] *Average Directorships per Outsider* and *Percent Busy Outsiders*.

social networks is favorable for company success. However, the social network data we have analyzed is apparently not depicting the social landscapes of interest.

Summing up, our findings do not support a positive effect from elite directors on firm performance. Rather, our results confirm hypothesis 1a, stating that directors holding multiple directorships impair firm performance, while being inconclusive between hypotheses 2a and 2b, regarding elite education and firm performance.

6.1 Suggestions for Further Research

In this study we have looked into how different board characteristics, related to the 'eliteness' of directors, affect firm performance. This is still a relatively unattended area of research, generally on a global basis and particularly in Europe, leaving much more to be explored. Judging from our contribution, there is much to be done in investigating social networks prevailing among the directors on company boards. We showed in this study that access to elite educational networks does not seem to matter for firm performance. However, it is likely that the directors' access to other kinds of networks do play a role for the success of the company. In this regard, it would be of interest to analyze the impact of a director's career history and industry tenure on performance related measures.

Furthermore, in our investigation of the effect of multiple directorships on firm performance, we have only analyzed the busyness in terms of board appointments held in listed companies. Therefore, there is still much to be done in investigating the impact of other, non-board related, commitments on directors' level of busyness, and in turn, firm performance.

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Interviews:

Investment Professional at Swedish Activist Investment Fund (Anonymized), telephone interview, 2007-04-02.

Appendix A: Causality between Multiple Directorships and Firm Performance

A1 Econometric Testing

There are several ways to test the causality of an established relationship between variables. One common way is to use instrumental variables. This procedure requires a suitable instrumental variable which is uncorrelated with the unobserved effect, captured by the error term, but at the same time correlated with the explanatory measures of multiple directorships. As with most corporate finance studies, finding a proper instrument is difficult.

Instead, we address the issue of causality in a simpler fashion. As already mentioned in section 3, when running the regressions we use the explanatory variables measured at the beginning of the year, while using the dependent variable measured at the end of the year. The reason for this is that we believe the occurrence of multiple directorships on a board to affect firm performance throughout the year. Extending this reasoning, we test our believed direction of causality[42] using differenced variables in our multiple directorships models. The logic behind this is that changes in the explanatory variables between the beginnings of two consecutive years should in turn produce changes in the dependent variable occurring between the ends of the same two years.

This procedure for testing causality is similar to the more formalized Granger test. In this test, it is said that if changes in explanatory variables cause changes in dependent variables, then the changes in the explanatory variables must come first. Therefore the Granger test includes lagged values of the explanatory variables when trying to explain the dependent variable (Gujarati 2003). What we do in our causality testing is much in line with the Granger test since we shift the dependent variable one year into the future instead of lagging the explanatory variables into the past.

To be able to test the direction of causality we first calculate the differences between 2003 and 2004 for all our dependent variables, explanatory variables, and control variables. We then test if the model written in difference form yields significant estimates for the explanatory variables with the same sign as in section 5.1. If it does, our arguments for the direction of the causality are strengthened. We only test the models regressing *Average Directorships per Outsider* on *M-to-B*, since they yield the strongest results as shown in section 5.1. The results from the causality tests are displayed in Table VIII below.

[42] I.e. that multiple directorships affect firm performance and not the other way around.

Table VIII: Results from Multiple Directorship Regressions in Difference Form

Dependent variable	MtB (Diff 03-04)	MtB (Diff 03-04)
Average Directorships per Outsider (Diff 03-04)	0.012	-0.018
	(0.908)	(0.845)
Board Composition (Diff 03-04) (% of outside directors)	1.221	1.193
	(0.348)	(0.359)
Natural Log of Assets (Diff 03-04)	-0.222	-0.225
	(0.599)	(0.596)
Board Member Average Ownership (Diff 03-04)	5.268	5.221
	(0.138)	(0.141)
Diff 03-04 Operating Margin (Diff 03-04)	-0.290	-0.274
	(0.645)	(0.664)
Foreign Outsiders Included	Yes	No
Intercept	0.230	0.228
	(0.001)***	(0.001)***
Adjusted R^2	0.030	0.030

*** Significance at the one percent level
** Significance at the five percent level
* Significance at the ten percent level

The results do not support our proposed direction of causality. In only one of the two regressions, displayed in the table above, does the dependent variable take on the expected negative sign. Furthermore, none of the dependent variables are significant, which in turn yields low R^2 values. In sum, the above cited tests do not aid us in establishing the direction of causality.

A2 Interview with Investment Professional at Swedish Activist Investment Fund

(Anonymized)

Telephone interview, 2007-04-02.

On the subject of appointing directors in turnaround:

"All else equal, a director who will be able to focus on the task at hand is always more attractive than one that is burdened by other appointments. Moreover, the director himself is likely to mind his reputation. Established directors with multiple directorships will probably be conscious not to take on too many new appointments, risking to be labeled irresponsible."

"It is highly unlikely that you would appoint a busy director in a turnaround situation. In such a case I would be inclined to suspect both a mal-functioning nominating committee and an irresponsible director."

Appendix B: Regressions for Previously Insignificant Results; Separating 2003 and 2004

B1 Multiple Directorships Regressions

In section 5.1 it was shown that multiple directorships have a negative impact on *M-to-B*. We now turn to check the robustness of the other results, pointing in the direction that multiple directorships have no effect on *ROA*. Hence, we perform some of the regressions in section 5.1, using *ROA* as the dependent variable, while separating 2003 and 2004. The reason is that one might suspect that the pooled OLS, including both years, is affected by substantial changes in the industry means of *ROA*, between the two years, in turn yielding the insignificant results found in section 5.1. The results from the tests, with 2003 and 2004 separated, are shown in Table IX below.

Table IX: ROA Regressed Separately for 2003 and 2004, Multiple Directorships Regressions

Dependent variable	ROA	ROA	ROA	ROA
Average Directorships per Outsider	-0.021		0.013	
	(0.019)**		(0.301)	
Percent Busy Outsiders		-0.058		0.039
		(0.066)*		(0.303)
Board Composition (% Outside Directors)	-0.026	-0.023	0.046	0.046
	(0.739)	(0.773)	(0.663)	(0.662)
Natural Log of Assets	-0.001	-0.002	-0.001	-0.001
	(0.836)	(0.642)	(0.829)	(0.894)
Average Ownership per Board Member	-0.102	-0.125	0.498	0.475
	(0.727)	(0.674)	(0.183)	(0.208)
Operating Margin	0.180	0.192	0.207	0.208
	(0.001)***	(0.001)***	(0.001)***	(0.001)***
Basic Materials	0.018	0.017	0.041	0.039
	(0.757)	(0.770)	(0.565)	(0.585)
Industrials	0.009	0.010	0.026	0.024
	(0.856)	(0.843)	(0.683)	(0.713)
Consumer Goods	0.032	0.034	0.055	0.052
	(0.564)	(0.546)	(0.413)	(0.441)
Healthcare	0.017	0.018	0.029	0.028
	(0.774)	(0.757)	(0.692)	(0.697)
Consumer Services	0.072	0.070	0.078	0.077
	(0.174)	(0.192)	(0.237)	(0.247)
Financials	-0.069	-0.072	-0.064	-0.066
	(0.165)	(0.155)	(0.305)	(0.289)
Technology	0.000	-0.001	0.035	0.033
	(0.998)	(0.982)	(0.617)	(0.635)
Year	2003	2003	2004	2004
Foreign Outsiders Included	No	No	No	No
Intercept	0.145	0.133	0.001	0.112
	(0.266)	(0.325)	(0.997)	(0.949)
Adjusted R^2	0.299	0.277	0.198	0.191

*** Significance at the one percent level

** Significance at the five percent level

* Significance at the ten percent level

As seen in Table IX, the multiple directorships regressions with *ROA* as the dependent variable, show significant results for 2003, pointing in the same direction as the regressions where *M-to-B* is used, in section 5.1. Both *Average Directorships per Outsider* and *Percent Busy Outsiders* are negative and significant at the five, respectively ten, percent level. Hence, the results from 2003 lend support to hypothesis 1a, stating that directors holding multiple directorships impair firm performance. Looking at the 2004 regressions, they do not provide the same results as the 2003 ones. Instead, both *Average Directorships per Outsider* and *Percent Busy Outsiders* show positive coefficients. However, none of them are significant. It should also be noted that the R^2 values are slightly lower when separating the years, compared to the pooled regressions, at the same time giving more explanatory power to 2003 than to 2004. In sum, the multiple directorships regressions with *ROA* as the dependent variable, using 2003 and 2004 as separate years, to a large extent point in the same direction as the results in section 5.1. Therefore, these results are slightly strengthened.

B2 Elite Education Regressions

As seen in section 5.2, the regressions for elite education, including 2003 and 2004 pooled together, show no significant results on *M-to-B* and neither on *ROA*. Therefore we estimate some of the same regressions, separating 2003 and 2004 for the same reason as stated above in section B1. The results from these regressions can be found in Table X below. The table shows results similar to the ones where the two years were pooled. Most of the variables have the same sign as in the pooled regressions, and still, explanatory variables on elite education are not significant. Hence, these results strengthen our previous findings pointing in the direction that elite education among directors has no effect on firm performance.

Table X: ROA and M-to-B Regressed Separately for 2003 and 2004, Elite Education Regressions

Dependent variable	**ROA**	**ROA**	**MtB**	**MtB**
Percent Outsiders with SSE Degree	-0.004	0.145	-3.105	0.281
	(0.983)	(0.524)	(0.375)	(0.941)
Percent Outsiders with RIT Degree	0.007	0.143	-3.161	-0.525
	(0.969)	(0.484)	(0.350)	(0.878)
Percent Outsiders with Chalmers Degree	0.051	0.200	-4.004	-1.213
	(0.813)	(0.430)	(0.349)	(0.774)
Percent Outsiders with MBA Degree	-0.048	-0.073	-1.729	-1.980
	(0.457)	(0.361)	(0.171)	(0.140)
Percent Outsiders with Elite Degree	-0.031	-0.143	3.323	0.527
	(0.861)	(0.526)	(0.341)	(0.889)
Percent Outsiders with University Degree	-0.107	-0.014	-0.904	-0.810
	(0.060)*	(0.830)	(0.409)	(0.465)
Board Composition (% Outside Directors)	-0.053	0.014	0.310	1.365
	(0.587)	(0.911)	(0.871)	(0.527)
Natural Log of Assets	-0.005	0.001	-0.057	-0.031
	(0.406)	(0.834)	(0.609)	(0.791)
Average Ownership per Board Member	-0.321	0.719	6.819	7.421
	(0.378)	(0.124)	(0.340)	(0.339)
Operating Margin	0.212	0.246	0.198	0.191
	(0.002)***	(0.001)***	(0.879)	(0.873)
Basic Materials	0.043	0.033	-0.077	0.534
	(0.530)	(0.693)	(0.953)	(0.703)
Industrials	0.036	0.031	1.044	2.014
	(0.536)	(0.677)	(0.363)	(0.111)
Consumer Goods	0.060	0.053	1.167	1.892
	(0.346)	(0.483)	(0.348)	(0.134)
Healthcare	0.059	0.016	0.678	1.622
	(0.375)	(0.843)	(0.598)	(0.228)
Consumer Services	0.094	0.110	2.534	3.802
	(0.124)	(0.142)	(0.036)**	(0.003)***
Financials	-0.050	-0.078	-0.020	0.319
	(0.372)	(0.251)	(0.986)	(0.776)
Technology	0.026	0.026	2.148	2.796
	(0.688)	(0.748)	(0.101)	(0.041)**
Year	2003	2004	2003	2004
Foreign Outsiders Included	No	No	No	No
Intercept	0.020	0.257	3.100	1.129
	(0.921)	(0.108)	(0.318)	(0.739)
Adjusted R^2	0.262	0.170	0.252	0.275

*** Significance at the one percent level

** Significance at the five percent level

* Significance at the ten percent level

Appendix C: Sample Overview

	Company Name	Industry[43]	Sample: Mult. Dir.	Sample: Elite Edu.		Company Name	Industry[44]	Sample: Mult. Dir.	Sample: Elite Edu.
A	ALFA LAVAL	2	◆	◇		MTG	5	◆	◇
	ASSA ABLOY	2	◆	◇		MUNTERS	2	◆	◇
	ATLAS COPCO	2	◆	◇	N	NCC	2	◆	◇
	AXFOOD	5	◆	◇		NIBE	2	◆	◇
	AXIS	2	◆			NOBIA	3	◆	◇
B	B & B	8	◆	◇		NORDEA	7	◆	◇
	BILIA	5	◆	◇	O	OBSERVER	8	◆	◇
	BILLERUD	1	◆	◇		ORC SOFTW.	8	◆	◇
	BOLIDEN	1	◆		P	PEAB	2	◆	
	BROSTRÖM	2	◆	◇		PROFFICE	2	◆	◇
C	CAPIO	4	◆	◇	R	RATOS	7	◆	◇
	CAPONA	7	◆			ROTTNEROS	1	◆	◇
	CARDO	2	◆		S	SAAB	2	◆	◇
	CASTELLUM	7	◆			SANDVIK	2	◆	◇
	CLAS OHLSON	5	◆	◇		SAS	5	◆	◇
	CLOETTA FAZER	3	◆	◇		SCA	3	◆	◇
	CARNEGIE	7	◆	◇		SCANIA	2	◆	◇
E	ELECTROLUX	3	◆	◇		SEB	7	◆	◇
	ELEKTA	4	◆	◇		SECO TOOLS	2	◆	◇
	ENIRO	5	◆	◇		SECTRA	8	◆	◇
	ERICSSON	8	◆	◇		SECURITAS	2	◆	◇
F	FAGERHULT	2	◆	◇		SHB	7	◆	◇
	F.SPARBANKEN	7	◆	◇		SKANDIA	7	◆	◇
G	GAMBRO	4	◆	◇		SKANSKA	2	◆	◇
	GETINGE	4	◆	◇		SKF	2	◆	◇
	GUNNEBO	2	◆	◇		SKISTAR	5	◆	
H	HALDEX	3	◆	◇		SSAB	1	◆	◇
	H & M	5	◆	◇		SWECO	2	◆	◇
	HEXAGON	2	◆	◇		SW.MATCH	3	◆	◇
	HOLMEN	1	◆	◇		SÄKI	7	◆	◇
	HUFVUDSTADEN	7	◆	◇	T	TELE2	6	◆	◇
	HÖGANÄS	1	◆			TELECA	8	◆	◇
I	INDUSTRIVÄRDEN	7	◆	◇		TELELOGIC	8	◆	◇
	INVESTOR	7	◆	◇		TELIASONERA	6	◆	◇
J	JM	7	◆	◇		TRELLEBORG	2	◆	◇
K	KLÖVERN	7	◆	◇		TV 4	5	◆	
	KUNGSLEDEN	7	◆	◇	V	VOLVO	2	◆	◇
L	LATOUR	2	◆	◇	W	WALLENSTAM	7	◆	◇
	LINDEX	5	◆			WIHLBORGS	7	◆	◇
	LJB.GRUPPEN	7	◆	◇	Ö	ÖRESUND	7	◆	◇
M	MEKONOMEN	3	◆	◇					

◆ Company included in the multiple directorships sample. ◇ Company included in the elite education sample.

[43] Industry Classifications: 1: Basic Materials/ 2: Industrials/ 3: Consumer Goods/ 4: Healthcare/ 5: Consumer Services/ 6: Telecom/ 7: Financials (incl. Real Estate)/ 8: Technology

Appendix D: Definitions

	Term	Abbreviation	Definition	Source(s)
A	Average Directorships per Outsider	MD_1	(Sum of total number of directorships (on the board of companies listed on the Stockholm Stock Exchange) held by all of the outsiders on the board of *the Company*)$_{(t)}$ / (Total number of outsiders on the board of *the Company*)$_{(t)}$	'Directors and Auditors in Sweden's Listed Companies'
	Average Ownership per Board Member	O	(Total percentage of the market capital of *the Company* owned by the outsiders of the board and the CEO)$_{(t)}$ / (Total number of outsiders + 1 (the CEO))$_{(t)}$	Company Annual Reports/ Swedish Financial Supervisory Authority
B	Board Composition (% Outside Directors)	PO	(Total number of directors who are not full-time employees of *the Company*)$_{(t)}$ / (Total number of directors on the board of *the Company*)$_{(t)}$	'Directors and Auditors in Sweden's Listed Companies'
E	EBIT	EBIT	Earnings before financial income, financial expenses and taxes.	Worldscope Database
	Elite Educational Degrees	-	Stockholm School of Economics, The Royal Institute of Technology, Chalmers University of Technology as well as any Master of Business and Administration (MBA) program.	Company Annual Reports/ Company Websites / University Alumni Departments
I	ICB-codes	ICB	Industry classification codes. Assigned according to the type of business a company conducts.	Worldscope Database
	Insider	-	A board director who also is a full-time employee of *the Company.*	'Directors and Auditors in Sweden's Listed Companies'
M	Market-to-Book	M-to-B	Market Capital$_{(t)}$ / Book Value of Equity$_{(t)}$	Worldscope Database
N	Natural Log of Assets	LA	Natural logarithm of the total assets of *the Company*, at time *t*.	-
O	Operating Margin	OM	EBIT$_{(t)}$ / Total Revenues$_{(t)}$	Worldscope Database
	Outsider/ Outside Director	-	A board director who is not a full-time employee of *the Company.*	'Directors and Auditors in Sweden's Listed Companies'

	Term	Abbreviation	Definition	Source(s)
P	Percent Busy Outsiders	MD_2	(Total number of outsiders holding more than three directorships (on the board of companies listed on the Stockholm Stock Exchange), on the board of *the Company*)$_{(t)}$ / (Total number of outsiders on the board of *the Company*)$_{(t)}$	'Directors and Auditors in Sweden's Listed Companies'
	Percent Outsiders with SSE, RIT, Chalmers or MBA Degree	SSE/RIT/C/MBA	(Total number of outsiders, on the board of *the Company,* holding an SSE/RIT/Chalmers/MBA degree)$_{(t)}$ / (Total number of outsiders on the board of *the Company*)$_{(t)}$	Company Annual Reports/ Company Websites / University Alumni Departments
	Percent Outsiders with University Degree	UD	(Total number of outsiders, on the board of *the Company,* holding an undergraduate degree)$_{(t)}$ / (Total number of outsiders on the board of *the Company*)$_{(t)}$	Company Annual Reports/ Company Websites
R	Return on Assets	ROA	$EBIT_{(t)}$ / Total $Assets_{(t-1)}$	-
T	Total Assets	-	Total company assets at year end.	Worldscope Database

Appendix E: Tests of Data Set Properties

In order to ensure the robustness of the estimated models we test some of the basic OLS assumptions, including heteroscedasticity, multicollinearity, and whether the residuals follow a normal distribution. Since our panel data contains observations from only two points in time we do not test for autocorrelation.

E1 Multicollinearity

Table XI: Pair-Wise Correlation, Multiple Directorships Regression

	MD_1	MD_2	PO	LA	O	OM
MD_1	1.00					
MD_2	0.91	1.00				
PO	0.00	0.03	1.00			
LA	0.40	0.36	-0.05	1.00		
O	-0.05	0.01	0.10	-0.35	1.00	
OM	-0.02	0.04	0.50	-0.03	0.32	1.00

MD_1: Average Directorships per Outsider
MD_2: Percent Busy Outsiders
PO: Percent Outsiders on the Board
LA: Natural Log of Assets
O: Average Ownership
OM: Operating Margin

Table XII: Pair-Wise Correlation, Elite Educational Regression

	SSE	RIT	C	MBA	E	UD	PO	LA	O	OM
SSE	1.00									
RIT	0.08	1.00								
C	0.04	-0.05	1.00							
MBA	-0.08	0.02	0.14	1.00						
E	0.71	0.58	0.42	0.05	1.00					
UD	0.26	0.16	0.19	0.24	0.37	1.00				
PO	0.03	-0.06	0.00	-0.10	-0.02	-0.16	1.00			
LA	0.13	0.05	0.08	0.20	0.11	0.16	0.01	1.00		
O	-0.12	-0.19	-0.14	0.08	-0.22	-0.03	0.05	-0.32	1.00	
OM	0.20	0.03	-0.04	0.02	0.11	-0.04	0.52	-0.04	0.34	1.00

SSE: Percent Outsiders with SSE Degree
RIT: Percent Outsiders with RIT Degree
C: Percent Outsiders with Chalmers Degree
MBA: Percent Outsiders with MBA Degree
E: Percent Outsiders with Elite Degree
UD: Percent Outsiders with University Degree
PO: Percent Outsiders on the Board
LA: Natural Log of Assets
O: Average Ownership
OM: Operating Margin

Multicollinearity means that there exist linear relationships between the explanatory variables of a regression model. In cases of high multicollinearity, precise estimation of a model becomes difficult.

There are several ways to detect multicollinearity. A common symptom is if a model shows a high R^2 value but few or no significant variables. As can be seen in sections 5.1-5.2 this is not the case for our estimated models, showing R^2 values between 0.11 and 0.32, but at the same time having several significant variables each. Another way to spot multicollinearity is if the estimated model displays high pair-wise correlations between the explanatory variables. Edlund (1997) points out that high correlation is present if one correlation value exceeds 0.8 or if several exceed 0.5. As can be seen in Tables XI-XII, displaying the pair-wise correlations for our models, there are no signs of multicollinearity.

In Table XI only one pair-wise correlation is above 0.5. The correlation of 0.91 should be disregarded since these two explanatory variables are never included in the same estimated model.

In Table XII two pair-wise correlations exceed 0.5 and one exceeds 0.7. However, since the high pair-wise correlations are relatively few, this is still not enough to point in the direction of substantial multicollinearity.

E2 Heteroscedasticity

Table XIII: Breush-Pagan / Cook-Weisberg Test for Heteroscedasticity

Multiple Directorships Regression		Elite Education Regression	
H_0: Constant variance		H_0: Constant variance	
χ^2	6.21	χ^2	12.79
$P > \chi^2$	0.29	$P > \chi^2$	0.24

Heteroscedasticity occurs when the disturbances appearing in a regression do not have constant variances. Having heteroscedasticity in a regression model has the consequence of making the estimated coefficients non-BLUE (best linear unbiased estimator).

In order to test for heteroscedasticity we use the Breush-Pagan / Cook-Weisberg test. Looking at the results of the testing displayed in Table XIII, we do not find any signs of heteroscedasticity in any of our estimated models at the five percent level.

E3 Distribution of Residuals

Table XIV: Skewness / Kurtosis Test for Normality

Multiple Directorships Regression

			Joint	
	P(Skewness)	P(Kurtosis)	Adj χ^2	$P > \chi^2$
Residuals	0.35	0.40	1.65	0.44

Elite Education Regression

			Joint	
	P(Skewness)	P(Kurtosis)	Adj χ^2	$P > \chi^2$
Residuals	0.91	0.95	0.02	0.99

If the estimated residuals do not follow a normal distribution it affects the hypothesis testing and the confidence intervals. To test if the residuals of our estimated models are normally distributed we use the Skewness / Kurtosis test for normality. Looking at the results displayed in Table XIV one can see that the hypothesis that the residuals of our models follow a normal distribution can not be rejected at the five percent level.

Appendix F: Missing Data and Outliers

The missing data and its causes are summarized in Table XV below:

Table XV: Summary of Dropped Observations

Multiple Directorships Sample	
Market Capital > 1 000 MSEK	105
Foreign Main Listing	-12
Delisting	-5
Missing Control Variable	-5
Outliers	-2
No. of Companies (Final Sample)	81
No. of Observations (Full Sample)	162

Elite Education Sample	
Market Capital > 1 000 MSEK	105
Foreign Main Listing	-12
Delisting	-5
Missing Control Variable	-5
Missing Educational Data	-10
Outliers	-2
No. of Companies (Final Sample)	71
No. of Observations (Full Sample)	142