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Value Creation under Private Equity Ownership

– A Survey among Danish Portfolio Companies

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Executive summary

The objective of this thesis is to determine drivers of value creation under private equity ownership by gaining an understanding of the theoretical tools private equity firms use to create return on their investments and comparing them with an empirical examination among Chief Executive Officers (CEOs) in Danish private equity owned companies.

The thesis takes a qualitative approach in determining value creation under private equity ownership and a questionnaire is therefore designed and targeted CEOs in Danish companies acquired by a private equity fund during the period 2004-2007, requesting the managers to rate the relative importance of theoretical levers for value creation in their companies while under private equity ownership.

The results show that corporate governance under private equity ownership lowers the agency costs as the incentive packages offered solves the principal-agency problems related to moral hazard, though there is a downside to the strong incentives if they come at a cost for unincentivized tasks. Financial engineering in terms of designing optimal capital structures has in contrast to expectations a negative impact on value creation. Hence, the capital structure may not have been optimal in the light of the financial crisis and the following slow-down in the economy. Consistent with theory, lowering the costs of free cash flow available for spending at the discretion of management through optimization of free cash flow and capital expenditures have a positive impact on value creation.

Active ownership and operational partner has a negative impact most likely because fund managers spent relatively more time on the low performing companies within their portfolio. There is a tendency that these areas are influenced by a psychological bias as the CEOs feel responsible for operational initiatives if they prove to be successful and on the other hand put more of the responsibility on the fund when the results are not achieved. A holding period of 5 years is found to maximize the value as years of ownership has a positive influence up until this point.

The relative importance measures of the value drivers indicate that it is the combination of the value drivers which are important in value creation and the combined effects of the private equity model from a social perspective are beneficial if direct value creation up weights potentially negative externalities of redistribution.

Contents

1. Introduction

There are in the literature ambiguous results on value creation under private equity ownership, though many papers show evidence that private equity owned companies on average outperform their peers, the results are sensitive to the chosen benchmark. Some researchers focus on the perspectives of the limited partners (LPs), evaluating private equity as an asset class, determining the performance of the investment net of fees and carried interest to the general partners (GPs) by comparing the return to that of a market index of alternative investments. Other researchers focus on the company level comparing returns with the companies' peer group adjusting for leverage.

Private equity funds have recently experienced increased competition within the industry, as many funds have committed capital which remains uncalled, also known as dry powder, combined with increased competition from the industrial buyers. In addition, the financial crisis has changed external conditions by making fundraising more challenging with Solvency II as well as making financing more difficult due to Basel III. Meanwhile the banks have become more risk adverse, tightening the lending facilities and demanding the funds to hold larger equity stakes in the portfolio companies, decreasing the return on equity. The forces combined means that driving returns from leverage or multiple expansions has become very difficult during the last 3-5 years. Instead, most industry reports points to operational improvements as the key behind future returns to private equity funds.

A recent analysis, made by Professor Achleitner in collaboration with Capital Dynamics, concludes that operational alpha of Danish private equity exits amounted to 6%. Of the total value creation during private equity ownership 30% were driven by leverage and 70% was driven by operational improvements and multiple arbitrage.[1] Despite taking into account peer performance and a potential positive bias if the funds exit the most lucrative investments, can it then be concluded that operational improvements made by the private equity funds resulted in a 6% higher return than the company, everything being equal, would have produced if it had not been private equity owned? Is the private equity model superior, such that alpha can be attributed to the private equity fund or is it rather a result of a selection process carefully identifying companies with high potential and then leaning back 3-7 years waiting to realize the results?

[1] Achleitner & Capital Dynamics (2011) page 13

The concept seems simple. The private equity fund buys a company and creates an optimal capital structure. Next step is to lay out a strategy and make sure that the management is capable of executing the strategy and transforming the company. If this is not the case, the task will be to find a new management who are capable of transforming the company, and provide them with the right incentives. After that, the fund keeps an eye on the business and make sure the company performs according to the goals. It appears very similar to the tasks for the board of directors in a publicly held corporation, so how come the private equity held companies can generate 6% excess return compared to their public peers? How come some funds consistently perform better than others? What is it private equity funds actually do in order to create value in their portfolio companies and which levers are responsible for the high return?

1.1 Literature

The challenges imposed by separation of ownership and control, has been recognized in the literature for more than 200 years.

"The directors of such [joint-stock] companies, however, being the managers rather of other people's money than of their own, it cannot be expected, that they should watch over it with the same anxious vigilance with which the partners in a private corpartnery frequently watch over their own. […] Negligence and profusion, therefore, must always prevail, more or less, in the management of the affairs of such company."[2]

Adam Smith (1776)

Berle & Means (1932) formalized the problem of separation of ownership and control and stated that "*Ownership of wealth without appreciable control and control of wealth without appreciable ownership appears to be the logical outcome of the corporate development"*.[3] The authors pose the question whether we have any justification for assuming that those in control of the modern corporation will chose to operate it in the interests of the owners. According to Berle and Means, the answer will depend on the degree to which the self-interest of those in control may run parallel to the interest of ownership.[4]

[2] Jensen & Meckling (1976) page 305
[3] Berle & Means (1932) page 69
[4] Berle & Means (1932) page 121

Modigliani & Miller (1958) contribute to the literature on capital structure and its impact on the value of the firm. Showing that in a world with no taxes, the value of the firm is independent of the capital structure. This changes when introducing taxes as the value of the firm can be increased by the present value of the tax deductibility of interest payments. The optimal capital structure becomes a trade-off between the benefits from tax savings balanced with the increased return on debt which converge towards equity and the costs of bankruptcy.

Jensen & Meckling (1976) explain the ownership structure taking agency problems into account. The authors demonstrate that agency costs are prevalent and that it is the owner who bear the costs as the market is rational an anticipate moral hazard. Jensen & Meckling suggest that reducing the dispersion of ownership may be beneficial if the costs of doing so are lower than the reduction in agency costs.

Finally, in 1989, Michael Jensen wrote his famous article *"Eclipse of the public corporation"*, stating that private equity could solve the conflict between owners and managers by using financial leverage and designing effective incentive schemes. Managers have an incentive to grow their firms beyond optimal size and the challenge is how to motivate managers to pay out cash rather than investing it in projects below the costs of capital. Jensen suggests that debt can reduce agency costs by decreasing the cash available for spending on low return project while properly designed incentive schemes can turn agents into principals.

More recent literature seeks to answer the question: *Is private equity superior to other types of investments*? By comparing the returns on private equity funds with alternative investments such as S&P500 or the returns on the portfolio companies to their peers, researchers distinguishes between whether private equity funds generate alpha through active management versus a closet beta resulting from a leveraged bet on the public equity markets. [5]

Kaplan & Schoar (2005) show that the average LBO fund returns net of fees are slightly less than those of S&P500 and fund performance is persistent meaning that GPs of funds that outperform in one industry are likely to outperform the industry in the next fund. They suggest that size and maturity of GPs matters as large funds and funds with higher sequence numbers generate

[5] Jones et al (2011) page 10

significantly higher returns. In particular, the internal rate of return net of management fees for the median fund generated only 80% of S&P500 return though the largest and most mature funds outperform S&P500 by 150%. The performance is persistent and associated with skills of the fund managers.

Phalippou & Gottschalg (2007) uses the same data set as Kaplan & Schoar (2005) to estimate the performance of private equity funds net of fee versus gross of fees. In the contrary to Kaplan & Schoar they find that the average performance net of fees and gross of fees is 3% below and 3% above the S&P500 respectively. There method differs from that of Kaplan & Schoar by selecting funds which are more than 10 years old with no recent signs of activity, weighting fund performance by the present value of investment rather than weighting by total committed capital, correct for sample selection bias as not all funds are represented in the sample and risk adjust for leverage. When adjusting for risks related to leverage the underperformance increases to 6% per year.

Bergström, Grubb & Jonsson (2007) examine value creation in Swedish buyouts. Their results suggest that the operating impact on buyouts is positive using EBITDA margins and ROIC measures for operational improvements. In addition, the authors find that changes in wage and employment, management shareholding and type of buyout has very limited explanatory power on operational improvements.

Lerner, Sorensen & Stromberg (2008) examine long-term innovation measured by patenting activity and find that firms pursue more influential innovations, measured by patent citations, in the years following private equity investments. The findings are inconsistent with sacrificing long-term investments and more likely a result of beneficial refocusing of the firm's innovative portfolios.

Kaplan & Strömberg (2009) give an introduction to the private equity industry and consider the empirical effect of changes in capital structure, management incentives and corporate governance introduced by private equity investors, suggesting that private equity creates economic value on average though subject to boom-and bust-cycles. Finally they report evidence that private equity investors take advantage of market timing in public to private transactions.

Acharya, Hahn & Kehoe (2009) examine deal-level data from 1996 to 2004 on private equity transactions in UK using data from mature private equity houses. They determine the return due to financial gearing, examine the operating performance of portfolio companies relative to that of quoted peers and finally assess at the characteristics of the governance and operational approach of the private equity funds. The results show that EBITDA margin and multiple improvements play an important role in explaining the variation in alpha. Finally they relate alpha and operating performance to the private equity funds' involvement in portfolio companies through interviews with general partners involved in the deals. In conclusion, they find that deals with higher alpha and higher margin growth are associated with greater engagement of the private equity funds during the early stages of the deal, productivity and organic growth initiatives and external support to top management.

Achleitner, Braun, Engel, Figge & Tappeiner (2010) also seek to answer the question, how value is created in private equity transactions. The authors calculate the return to the private equity fund when taking out the effect of leverage in order to distinguish between the return due to financial and operational risk and find that two-thirds of value creation can be contributed to operational and market effects, while one-third are due to leverage. The unlevered return is then split into EBITDA growth, free cash flow effect and multiple effect and finally there is a combination effect accounting for simultaneous changes in EBITDA and EBITDA multiples.

As mentioned in the introduction, Professor Ann-Kristin Achleitner has in collaboration with Capital Dynamics made a similar analysis covering 44 realized private equity transactions across 11 fund managers in Denmark. By matching a sample of 44 realized private equity investments with public benchmark companies and adjusting the internal rate of return for leverage they find an excess return from private equity investments called operational alpha of 6%. Furthermore, 70% of the value creation is generated by operational and market effects. The sample average of IRR is 37.7% and a median of 29.9% demonstrates high returns on realized investments though not covering the sample selection process.[6]

[6] Achleitner & Capital Dynamics (2011) page 13

1.2 Problem formulation

Inspired by the analysis, made by Professor Ann-Kristin Achleitner in collaboration with Capital Dynamics, the objective of this thesis is to go one step further in determining what drives value creation under private equity ownership, by further breaking down the drivers of value creation for Danish portfolio companies seeking to answer the research question:

How is value created in Danish portfolio companies under private equity ownership, and which drivers can explain the resulting returns?

The research question can be divided into two parts:

1) *How can private equity funds create value for their portfolio companies and what characterizes the value drivers from a theoretical perspective?*

The first step is to understand how private equity funds operate and map the tools private equity funds have for creating returns from their investments.

2) *What drives value creation under private equity ownership in Denmark?*

The second step is to find empirical evidence of private equity tools that generate value for the portfolio companies.

This thesis will answer the questions through a theoretical discussion of value creation drivers, and an empirical examination among Chief Executive Officers (CEOs) in Danish private equity owned companies.

1.3 Scope and delimitation

The purpose of the thesis is solely to determine value drivers of returns from private equity held companies. The thesis will not cover whether the value is sustained after exit or how it is distributed among investors.

The thesis does not control for peer group performance. The aim of taking peer performance into account is usually to capture underlying industrial macro trends.[7] However, selection of peer group

[7] Bergström et al (2007) page 27

constitutes a bias in existing literature as peer groups are only selected among public listed companies and without a perfect comparable peer group, it will not be possible to control for how the company would have performed if not acquired by the fund and the peer group will in itself constitute a bias. Also survivor bias in peer groups and the results will be sensitive to the choice of peer-group.[8]

In sum, there is a reason why the funds have acquired the portfolio companies and not their peers, and the thesis will focus on the relative value creation among selected companies. Hence comparing relative differences in value creation among private equity owned companies. For this approach to deliver consistent results is an implicit assumption, that the deals have been equally lucrative from the point of the private equity funds at the time of acquisitions, and it is the variation in use of value drivers which is responsible for the resulting returns. This is a strong assumption as underlying industry shocks will impact the companies upon acquisition, but the assumption is not expected to affect conclusions regarding relative importance of the drivers.

1.4 Source criticism

The thesis use mainly scientific papers as references since the work of researchers published in acknowledged papers, need to fulfill certain requirements of quality and have been through review of experts. In addition, books from the syllabuses of courses taught at CBS, and thereby selected by researchers are used as primary sources.

Supplementary material to scientific papers and textbooks are also used though it is possible to question the validity of such analyses since there may be issues of conflicting interests. This will be taken into consideration when using such information though I do not believe it is crucial for my conclusions.

An example of supplementary material are the analysis by Achleitner made in corporation with Capital Dynamics including data from funds, which have voluntarily provided the authors with data. The analysis does not mention the companies, for which it has not been possible to obtain data, and consequently may be subject to selection bias. Also, the collaboration with Capital Dynamics may

[8] Bergström et al (2007) page 29

put an underlying agenda of the research, as Capital Dynamics will be interested in a positive outcome favoring private equity investment.

Other examples of supplementary material are industry reports made by advisory firms such as consultancies and investment banks, earning money on advising the portfolio companies. There is therefore a potential bias related to operational excellence and the use of experts with industry knowledge, as they are marketing their own business when describing the private equity industry. However, despite these limitations, the information from alternative sources may provide useful insight in the thoughts of practitioners.

2. Theory

2.1 Introduction to private equity

A private equity firm raises capital through a fund and serves as the general partner (GP) of that fund. Investors also called limited partners (LP) commit to provide a certain amount of capital for investments in companies. The return to the general partners private equity fund also known as carried interest amount 20% of the return above a given hurdle rate of typically 8%. In addition, the funds are paid a management fee of 1-2% of committed capital. The funds are typically closed-end vehicles, meaning that investors cannot withdraw their money until the fund is terminated.[9] In figure 1 below, the structure of private equity funds are summarized.

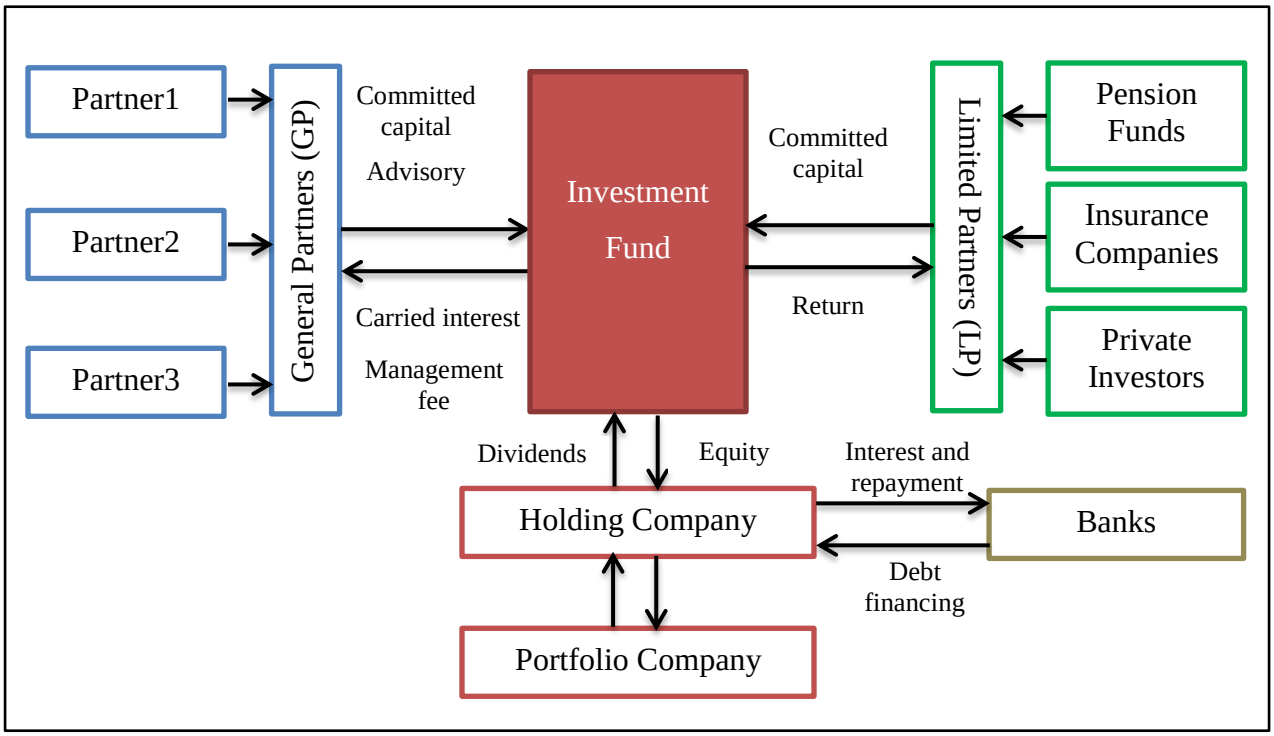

Figure 1: Private equity structure
Source: DVCA & Spliid (2007) page 38-41

Illustrated in figure 1, the parties involved in private equity investments are sophisticated. The limited partners represented by pension funds, insurance companies and high-net worth private investors are professional as well as the banks and general partners.

[9] Kaplan & Strömberg (2009) page 123

The ownership horizon is limited to a period of typically 3-7 years as the funds do not buy companies for the purpose of owning them, but in order to restructure them and thereby make a profit. The time frame 3-7 years comes from the nature of the funds lifetime of typically 10 years and the fact that the gain of exit is tax free after 3 years holding.[10]

Private equity funds differ from other asset classes by having a focused and active ownership with a limited time horizon that creates a sense of urgency, including management as co-owners, optimizing capital structure and performance dependent fees to general partners.[11] The ownership structure facilitates less political considerations and access to capital through better credit facilities in banks allowing a shorter and more effective decision process. Also, the fund's industrial network can help strengthening the management team and board of directors, the performance based pay to key employees act as a screening device when attracting qualified workers, as well as knowledge sharing across investments. An advantage of private equity is the matching duration of the owner's capital horizon and its investment opportunities in the portfolio companies.[12] On the downside, exit pressure can shift managements' focus from long to short-term value creation and legitimacy problems of the fund may affect reputations of portfolio companies.

The private equity industry has some sources of controversy, which sometimes creates legitimacy problems. First, the impact on employment which decrease by 3% within existing operations and increases by 2% on new operation, hence a net impact of 1% decline on average. Second, the amount of money made by the top private equity firms and their partners through fees and carried interest along with tax issues on both tax deductions of interest payments and taxation of realized returns. Third, the industry is characterized by boom-and-bust cycles as new capital flows into the industry when reported returns are high which tend to coincide with interest rates being low relative to stock prices. This leads to more deals at higher prices which at the peak of the cycle lead to lower returns which in turn lead to less committed capital. [13]

[10] Spliid (2007) page 33-34
[11] Spliid (2007) page 17-18
[12] Jones et al (2011) page 33
[13] Jones et al (2011) page 13

Also, critics of private equity state that part of the returns earned by the funds come from tax breaks, quick flips and multiple expansion as well as the limited ownership horizon come at a cost for long-term growth in order to boost short term performance. [14]

2.2 Measuring performance

Private equity funds may be perceived as a series of individual cash flows and the internal rate of return (IRR) are therefore the best way of measuring these. The IRR on an investment is the required return that results in a zero net present value when used as a discount rate. As IRR is a measure of compound return, returns are usually measured by calculating the cumulative return of a fund each year, also known as the J-curve. In other words, the J-curve is the mapping of the IRR each year, indicating the liquidity from an investor's point of view. The IRR have one drawback as IRR measures the return earned on money while it is invested in a project but does not take into account the length of time for which it remains invested. The difficulty of maintaining an IRR increases each year as the return must at least compound itself in order for IRR to stay the same. An investment must double over three years to produce an IRR of 25% but must treble over 5 years to obtain the same return. Hence there is a tradeoff between holding period, IRR and multiple.[15]

2.3 Private equity in Denmark

A Danish private equity fund has a limited time horizon of approximately 10 years, in which it typically owns 10-15 companies. Private equity funds in Denmark manage approximately DKK 70 billion predominantly from pension funds and banks and focus primarily on small to medium sized companies.[16] In 2010, sales from portfolio companies were DKK 191 billion corresponding to 10.9% of Denmark's GDP that year.[17] Illustrated in figure 2 below, the number of buyouts and exits are cyclical.

[14] Lerner et al (2011) p. 446
[15] Fraser-Sampson (2007) page 34-37
[16] DVCA (2012a) page 2
[17] DVCA (2010), Statistikbanken (NATN01)

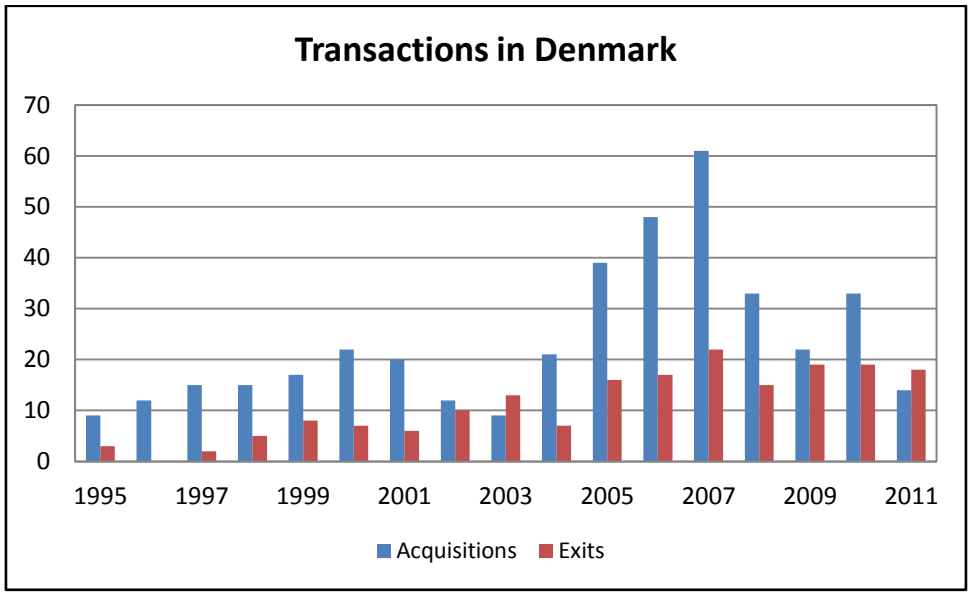

Figure 2: Number of Danish transactions incl. minority investments
Source: DVCA (2012b)

According to Vækstfonden, 24 private equity funds were active and had investment departments in Denmark in 2008.[18] In addition, international private equity funds without investment departments in Denmark owned Danish companies in 2008, why the actual number of active private equity funds in Denmark is larger.

2.4 Principal-Agency theory

The principal-agency problem arises because of the different interests between the agent, often thought of as the manager, and the principal, typically referred to as the owner. The agent carries out actions on behalf of the principal and by nature their objectives are in conflict, as cost for one is revenue for the other. Theory distinguishes between three main themes: moral hazard, adverse selection and signaling, which arises when introducing asymmetric information. In particular, a moral hazard problem arises when the agent's actions are not verifiable or when the agent receives private information after the relationship has been initiated. In situations of moral hazard, the principal cannot observe the agent's actions causing informational asymmetries and the solution is to internalize the incentives via the contract terms. An adverse selection problem is characterized by the agent holding private information before the relationship has begun. The principal can verify the

[18] Vækstfonden (2008) page 25

agent's behavior but the principal knows the agent could be any of several different types between which the principal cannot distinguish, but by offering alternative contracts the agent's choice reveal his private information. Finally, signaling is related to situations where one of the parties has some important information, which is signaled to the other party via the informed behavior. Hence, before signing the contract, the agent can send a signal, that is observed by the principal, revealing his type.[19]

2.5 Corporate governance

Using the definition of Shleifer & Vishney, *corporate governance deal with the ways in which suppliers of finance to corporations assures themselves of getting return on their investment.*[20] In practice, management will have significant discretion when allocating the investors' funds and managerial expropriation can come from executive compensation, consumption of perquisites as well as staying on the job when they are no longer competent to run the firm. If an agency problem persists, the suppliers of finance will get a lower return on their investment as a result of agency costs. Hence, a good governance structure is one that selects the most able managers and makes them accountable to investors.[21]

Corporate governance deals with the design of incentive contracts and as mentioned above, part of the solution to the agency problem is to internalize the incentives via the contract terms aligning the interests of the principal and the agent.

A problem of incentive contracts is that they create opportunities for self-dealing for the management when negotiated with week board of directors.[22] Board of directors is an important part of governance, and also at the board level, the private equity fund can reduce agency problems such as director free-riding by reducing the board size and provide the board of directors with incentives.[23] Empirics show that when the board of directors has incentives, it will lead to a higher CEO turnover.[24] When the CEO has influence on board composition, the board-CEO relationship

[19] Macho-Stadler & Pérez-Castrillo (2001)
[20] Shleifer & Vishny (1997) page 737
[21] Tirole (2001) page 2
[22] Shleifer & Vishny (1997) p. 742-745
[23] Hermalin & Weisbach (2003) page 13
[24] Hermalin & Weisbach (2003) page 15

complicates the agency model, as the agent will be able to impact who is his principal.[25] Concentrated ownership address the agency problem in the sense that the owners both have a general interest in profit maximization and enough control over the assets of the firm to have their interests respected. [26]

An optimal incentive contract optimizes total incentives. Managers need not only be motivated by monetary incentives, but will also have concerns regarding reputation. Individuals' actions are influenced by career concerns creating incentives even in the presence of incentive contracts and are stronger when a worker is further away from retirement.[27] The concentrated ownership allows for greater enforcement of corporate governance as CEO replacement will be a decision for the owners to take, and a resignation of a CEO will not only damage the compensation to the CEO but also his career. Hence, the increased risk of being replaced as a result of bad performance decrease agency costs.

2.5.1 Capital structure

As mentioned in the literature review, Modigliani & Miller wrote their pioneering piece on capital structure in 1958. M&M proposition I states that in a world without taxes the value of the firm is independent of the firm's capital structure: $V_j = (E_j + D_j) = \frac{\bar{X}_j}{r_A}$

where E_j is the market value of equity, D_j is the market value of debt, $\bar{X}_j$ is the expected return on the assets owned by the company and r_A is the capitalization of expected return or in other words the required rate of return on the firm's assets.[28] Introducing taxes, τ, proposition I become: $\frac{\bar{X}_j^{\tau}}{V_j} = r_A$,

where the total income net of taxes are given by:

$$\bar{X}_j^{\tau} = (\bar{X}_j - rD_j)(1-\tau) + rD_j = \bar{X}_j - \tau\bar{X}_j - rD_j + \tau rD_j + rD_j = \bar{X}_j - \tau\bar{X}_j + \tau rD_j = \pi_j^{\tau} + rD_j$$

[25] Hermalin & Weisbach (2003) page 20
[26] Shleifer & Vishny (1997) page 754
[27] Gibbons & Murphy (1992) page 469
[28] Modigliani & Miller (1958) page 268

And the value of the firm is no longer independent of capital structure:

$V_j = (S_j + D_j) = \frac{\bar{X}_j^{\tau} - r_D D_j}{r_E} + D_j = \frac{\bar{X}_j^{\tau}}{r_E} + \frac{(r_E - r_D) D_j}{r_E}$, where r_E is the capitalization rate of equity. For $r_E > r_D$ the value of the firm will increase with debt.

Hence, the value of the leveraged firm is equal to the value of the firm unleveraged plus the tax shield.

M&M proposition II states that a firm's cost of equity capital is a positive linear function of the firm's capital structure: $r_E = r_A + (r_A - r_D)\frac{D_j}{E_j}$, where r_E, is the expected return on equity, given by the capitalization rate plus a premium for the financial risk proportional to the debt-equity ratio.

The firm's cost of equity depends on the required rate of return on the firm's assets, the firm's cost of debt and the debt-equity ratio. Introducing income taxes proposition II becomes:

$r_E = r_A + (r_A - r_D)\frac{D_j}{E_j}(1 - \tau)$

If the return on the assets are higher than the interest rate, the return on equity is increasing with increased debt-equity ratio.

Trade-off theory, built on the contributions of Miller & Modigliani, is a static approach of determining optimal capital structure as a trade-off between the advantages of debt from tax-deductible interest payments and the cost of financial distress. The tax savings from interest expense are also known as the interest tax shield. When the fraction of debt increases, the probability that the firm will be unable to fulfill its obligation toward debt holders will increase. Legal and administrative costs are directly associated with bankruptcy, while indirect bankruptcy costs comprise the costs of avoiding a bankruptcy when management spent their time trying to avoiding bankruptcy rather than running the business, sales may be lost, valuable employees may leave and profitable investments may not be taken. The costs of financial distress refer to both direct and indirect costs of bankruptcy.[29]

[29] Ross, Westerfield & Jordan (2008) page 567-570

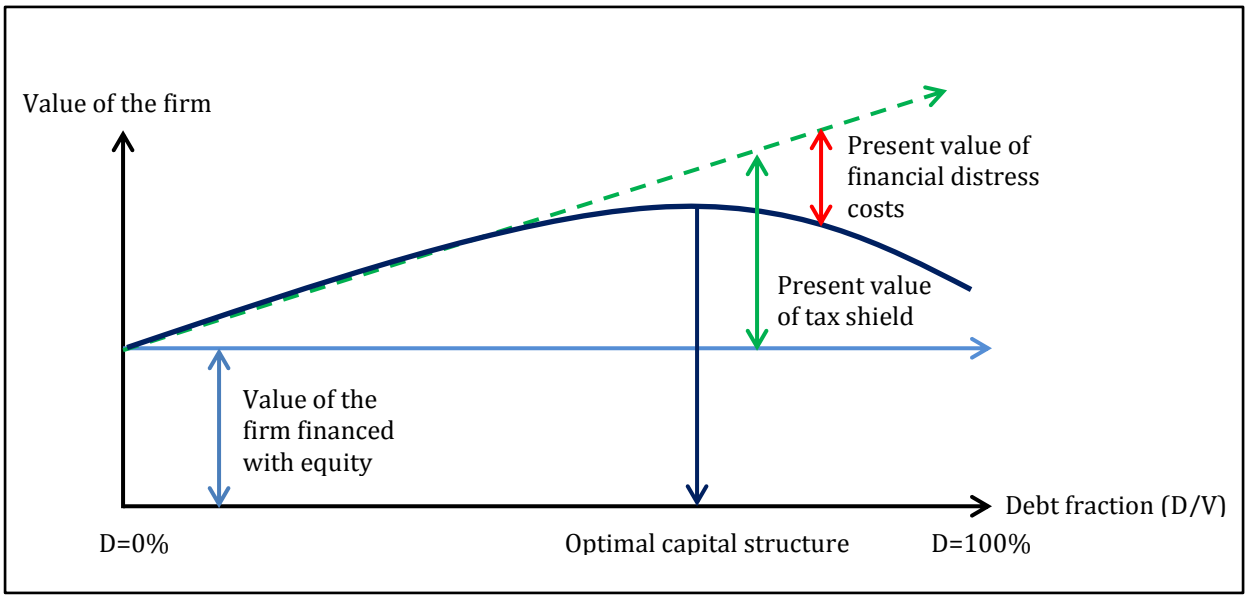

Figure 3: Optimal capital structure under trade-off theory
Source: Ross, Westerfield & Jordan page 570

Though trade-off-theory is inspired by Modigliani & Miller, Miller does not support trade-off-theory and states that even in a world in which interest rates are fully deductible in equilibrium the value of the firm will still be independent of capital structure. The argument is that despite acknowledging the bankruptcy and agency costs, the costs seem disproportionally small relative to the tax savings they should be balancing.[30]

A competing theory to trade-off theory is pecking order theory, stating that firms prefer equity financing as selling securities to raise capital may be expensive. Pecking order theory implies that there is no optimal debt/equity ratio and profitable firms will use less debt and that financial slack has value allowing management to finance projects quickly.[31]

Optimal capital structure depends on earnings volatility and the probability that the owners can facilitate more capital if needed. If the company generates large stable cash flow and the owners can pay in more equity if the company need liquidity will allow a larger fraction of debt. Raising more capital on the stock markets is expensive and takes time and empirical finding of lower debt-equity ratios in publicly held companies compared to privately held companies are consistent with both

[30] Miller (1977) page 262
[31] Ross, Westerfield & Jordan (2008) page 575-576

trade-off theory and pecking order theory. The need of equity financing is therefore smaller for companies with large and stable cash flows.[32]

2.6 Value drivers

Private equity firms have three levers of value creation in the portfolio company; Governance, Finance and Operational engineering. In addition, returns may be driven by multiple expansion.

2.6.1 Governance

Private equity funds can improve corporate governance by solving the principal-agent conflict, described in Jensen 1989, through concentrated ownership, more active board and better incentive schemes. Closer monitoring through concentrated ownership by professional investors enable involvement in decision making as well as better alignment of interests will lower the agency costs, turning agents into principals. Boards of private equity owned companies are typically smaller and meets more often than boards of publicly held companies.33 Also alignments of interests for board members play a role as well as the concentrated ownership results in a higher CEO turnover.

Private equity firms seek to solve the principal-agency problems especially through mitigating the problem of moral hazard. Private equity funds require the management to invest in the company creating not only a large upside, but also a significant downside, turning agents into principals and thereby better aligning the interests. Meanwhile the illiquidity of the investment reduces incentives to manipulate short-term performance. Research report that CEOs own around 6% of ordinary equity and top management combined own around 15%.[34]

One important premise for the monetary incentive programs to result in value creation is that the managers are motivated by compensation. However, compensation packages are not the only driver of incentives. For CEOs in the earlier years of their career reputational concerns constitute a stronger motivation and the stronger enforcement of governance as a result of a higher CEO turnover will increase importance of such incentives.[35] CEOs close to retirement will typically be replaced at the time of the acquisition, and from a governance perspective this make sense as solving

[32] Spliid (2007) page 24-25
[33] Kaplan & Strömberg (2009) page 131
[34] Acharya et al (2009) page 30
[35] Gibbons & Murphy (1992) p. 469

the agency problem for a manager close to retirement will be more difficult as such manager will not have the same time horizon as the private equity fund.

Also adverse selection may play an important role in private equity owned companies. 39% of the management is replaced within the first 100 days of ownership and 69% are replaced at some point during the deal.[36] When replacing the management, the contract offered by private equity firms may act as a screening devise, attracting management with certain characteristics and sensitivity to performance based pay.

2.6.2 Finance

The funds can optimize capital structure as companies with other ownership structures often has a too low fraction of debt financing and since equity is relatively more expensive than debt financing, it pays to minimize the fraction of equity. M&M proposition II illustrates the excess return private equity funds can earn due to higher possible leverage as a result of the fund being able to finance liquidity needs if necessary, as a larger fraction of debt increases the return on equity. The optimal capital structure maximizing the value of the firm and is a trade-off between the costs and benefits of debt. The optimal level of debt will therefore be a trade-off as increased leverage on the one hand imposes costs of financial distress and bankruptcy, while on the other hand debt is relative cheap compared to equity reinforced by tax deductions and puts a pressure on managers not to waste money reducing the agency costs of free cash flow available for spending at the discretion of managers.[37]

In addition, the funds can improve free cash flow (FCF) generation and optimize capital expenditures (CAPEX). Free cash flow is cash available for distribution among debt and equity holders and by increasing operational liquidity through networking capital and increased free cash flow can serve higher interest payments and facilitate a higher level of debt financing. Also putting an upper bound on capital expenditures such that only the highest return investments are initiated should increase return on invested capital. The combined effect of free cash flow and capital expenditures should have a positive impact on the return on equity.

[36] Acharya et al (2009) page 32
[37] Jensen (1986) page 324

2.6.3 Operational

Operational value creation refers to industry and operating expertise, which may be brought in to the company directly from the general partners in the fund and consultants employed by the fund or indirectly through the board of directors and hiring experienced management.

Defining operating partners as individuals with experiences as senior executives in the corporate world, consulting and/or private equity.[38] The fund can act as an operational partner, and the operational input is said to be direct. In this case, the fund managers may be a sparring partner to the management, facilitating a longer-term perspective and time-out from quarterly reporting, formulating strategic changes, growth initiatives and improvement of efficiency. [39] The fund manager need not be the specialist as the fund can also employ a staff of internal consultants, with background in consulting or deep experience in a specific function such as IT, HR or marketing providing analytical insight, strategic guidance and assistance in execution. [40]

The fund can also facilitate operational knowledge more indirectly through the board of directors and management by offering the company a network of contacts.[41] Retired executives with experience in the industries the private equity funds target can assist the fund when locating potential acquisitions and be brought in as board member in portfolio companies. The size of the transaction and the level of control by the private equity fund will impact the amount of overhead costs worthwhile allocating the acquisition.[42] Poor firm performance can be a result of inefficient management and replacement of such may lead to operational improvements.[43] Replacing top management at the time of the acquisition can be a way in which, the fund can add operational capabilities to the firm by hiring a manager with deep experience relevant to the particular challenges facing the company. If a change in management is necessary, the fund will want to make the changes as fast as possible, in order to get the full impact. The first year is crucial since improving results during the first year of ownership is indicative for how well the investment is likely to fare in the long run, as early success in operational improvements usually result in

[38] Matthews et al (2009) page 21
[39] Kaplan & Strömberg (2009) page 132
[40] Matthews et al (2009) page 21
[41] Bergström et al (2007) page 23
[42] Matthews et al (2009) page 21
[43] Bergström et al (2007) page 24

permanently altering the company's culture.[44] The funds operational tools are summarized in figure 4 below.

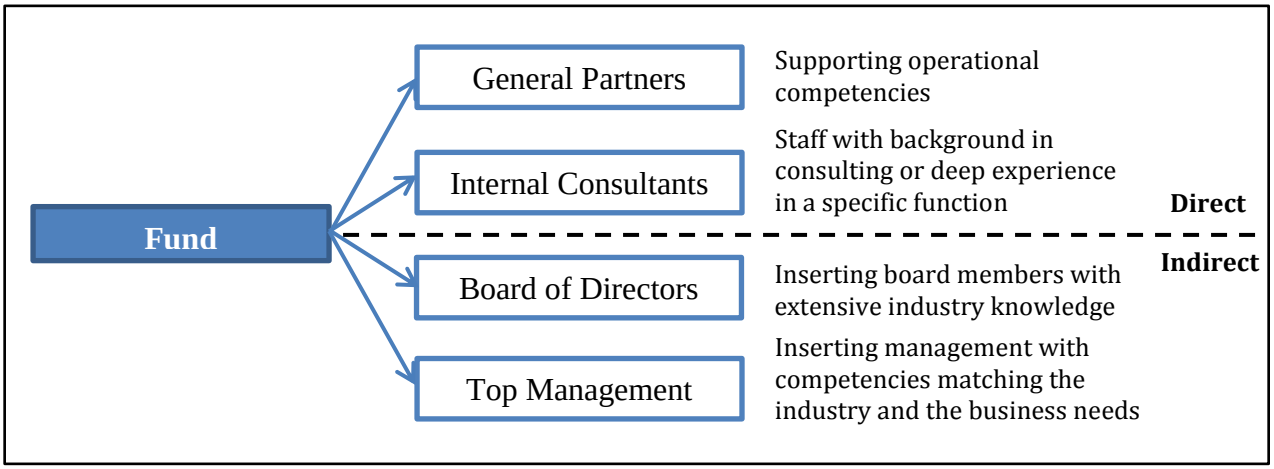

Figure 4: Operation tools for value creation

Making the company more effective through organic growth and operational improvements is not the only source of value creation. Industry consolidation and the resulting synergies of mergers and acquisitions can help the company to obtain a critical mass as well as divestments of non-core business may be a way of increasing return on invested capital.[45]

2.6.4 Multiple expansion

Private equity firms need not only gain returns from governance, financial or organizational improvements. As mentioned above, critics of private equity state that part of the return earned by the funds comes from quick flips and multiple expansions. That is, exits soon after investments enabling the funds to extract fees and market timing from potentially mispricing between equity and debt markets, which may allow for multiple arbitrages and negotiation skills attributed to fund managers may partly be responsible for the return. [46] Finally, the limited ownership horizon leads to speculations on whether private equity funds sacrifices long-term growth to boost short term performance.[47]

[44] Matthews et al (2009) page 25
[45] Nikoskelainen & Wright (2007) page 520
[46] Acharya et al (2009) page 21
[47] Lerner et. al (2011) p. 446

3. Methodology

The challenge in working with privately held companies is the lack of data availability. Accounting data is limited as privately held companies are not obliged to disclose the same amount of information as publicly held corporations. Similar, the internal rate of return (IRR) to the fund and the enterprise value of the companies (EV) are only disclosed for a small number of deals. In addition, the available accounting data not necessarily a good measure of value creation as there may be large differences between book value and market value, goodwill recognition post the buyout as well as divestments and acquisitions may distort the yearly comparability and a suitable peer group may not exist. Finally, the time frame for the funds' ownership may result in short term loses and makes the companies incomparable until exit.[48] In sum, changes in various accounting measures of operating efficiency serve only as a proxy and not a direct measure of value. In addition, changes in operating characteristics can be short-term and may have a negative impact on the future prospects of a company.[49]

This thesis takes a qualitative approach in determining value creation under private equity. Existing literature points towards governance-, finance-, operational engineering combined with multiple expansion as the main drivers behind private equity returns. A questionnaire is therefore designed and targeted Chief Executive Officers in Danish companies acquired by a private equity fund in the period 2004-2007, requesting the CEOs to rate the relative importance of the theoretical levers for value creation in their companies while under private equity ownership.

3.1 Data

The data is collected through a survey among CEOs of private equity owned companies acquired in the period 2004-2007, using DVCA's lists of buyouts.[50] The time horizon is chosen in order to compare companies in the same business cycle. According to the list, 169 companies were acquired during the period and adjusting for duplicates as a result of consolidations the sample of possible companies amounted to 154 companies. Using Green's database the CEO's of the companies during the ownership period has been identified. Among these companies, it has not been possible to locate

[48] Bergström et al (2007) page 26
[49] Nikoskelainen & Wright (2007) page 513
[50] DVCA (2012b)

everyone. During the period, 18 companies have gone bankrupt and are excluded as no information about CEOs was available in the Greens database.

The CEOs were questioned about the holding period, the enterprise value and the IRR to the private equity fund and whether the fund was still under private equity ownership, together with 11 qualitative questions related to the theory and critics of private equity. Finally, the CEOs were asked to rank the relative importance of the value drivers. The CEOs were offered confidentiality such that only aggregate results will be used in the thesis and no response can be linked to the CEO, the company or the fund. Please refer to appendix 1 for the questions and appendix 2 for the confidentiality agreement.

In sum, 111 CEOs of 99 different companies were contacted by email and 54 have returned the questionnaire while 31 have replied they were not interested in participating. A typical reason given in the refusals to participate is that the CEO is unable to participate due to confidentiality or that the CEO receives tons of questionnaires each week and will not spend time on it. The first reason is a bit troubling if there are certain characteristics of those deals resulting in a higher degree of confidentiality. As for the last 28 missing responses it is possible that some have not received the questionnaire, while others choose just not the reply. Recent management changes have made it possible to contact more CEOs than companies, resulting in four duplicates such that two CEOs representing the same company has answered. Though the responses are not identical, there are consensuses in the responses, which will be evident in the paragraph *11. Robustness and potential biases*.

The larger the sample is always preferable, but the response rate of 48.6% is satisfying, when considering that it is CEOs who has been the target of the questionnaire. An analysis from Graham & Harvey (1999) survey CFOs of American companies resulted in only 9% response rate when questioning the CFOs about the cost of capital, capital budgeting and capital structure.

3.2 Sample bias

The data may be subject to biases in a number of ways. The DVCA list may not be exhaustive and if some buyouts are not on the list they will be excluded from the sample. The Green database is neither complete and information regarding management at the time of the ownership has not been

available for all of the companies. In these cases Navne og Numre Erhverv's database combined with newspaper articles has been used. Finally, not all CEOs have been possible to contact as some has retired and others have too generic names to make it possible to find them. However, it does not appear that the CEOs, which have not been found, have anything systematically in common such that excluding them may not cause much of a bias.

In order to make statistics inferences about the data, the sample will have to be random. Random sampling should be unbiased such that each unit has the same chance of being chosen and independent such that the selection of one unit does not have any influence on the selection of other units. Hence all possible samples of *N* objectives should be equally likely.

A more concerning bias are therefore a self-selection bias such that CEOs that chooses to respond to the survey have certain characteristics. Even though high as well as low return companies are represented, it may be that CEOs of companies still under private equity ownership are more reluctant to answer if the expected return is low as opposed to CEOs of companies already exited by the fund or CEOs who has quitted their jobs. Despite the Confidentiality Agreement the CEOs seem very cautious in answering questions that may put the fund in a negative light.

3.3 Issues related to the methodology

In a survey, comparable set of information are conducted for a number of units using standardized question with predefined possible answers. The sequence of questions impacts the responses as the first questions affect the perception of the last questions and the respondents will avoid contradiction. Questions regarding facts are put in the beginning as they are supposed to be easier to answer and the questionnaire is made as short as possible in terms of the number of questions as well as possible answers to select between. The response rate is maximized through reminders and personal contact on the phone.

When conducting a survey through a questionnaire, it is important to distinguish between facts and attitudinal questions, as responses to attitudinal questions will be subjective and it will vary among the respondents how likely they are to use the scale of response possibilities. Also, a challenge may be whether the respondents interpret the questions as intended. Finally the questionnaire may have a

positive bias in the sense that the focus was mainly on value creation rather than value destruction when designing the survey.[51]

An important feature of the design is a psychological bias may persist and affect the questions which relying on subjective answers. As shown in figure 4, inserting management with competencies matching the industry and business needs is a way in which the fund can add operational capabilities. Illustrated in figure 5 below, the value drivers are split among key contribution from the fund and the management. From the CEOs point of view, the management is hired to operate the company and will feel responsible for operational improvements in the company and the funds main contribution will be related to governance and finance. Though there is an overlap of the value drivers if a psychological bias persists, the management will tend to move the dotted line upward taking responsibility for successful initiatives and move the dotted line downwards transferring the responsibility to the fund for unsuccessful decisions. And vice versa if the fund managers had been target for the questionnaire the psychological bias would have been opposite.

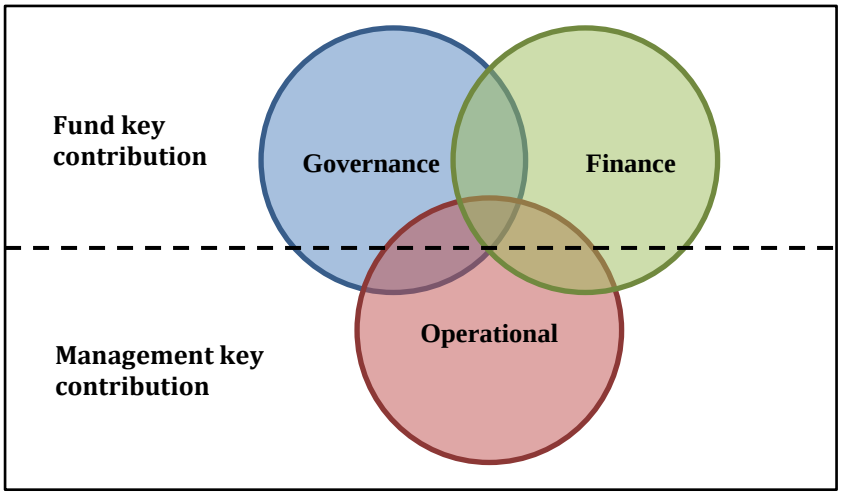

Figure 5: Fund versus management contribution

It is therefore important to take such bias into account when evaluating the responses of the survey.

[51] Riis (2005) pages 121-147

4. Estimation technique

In the following, the internal rate of return, IRR, will be used as a measure of value creation for a given company, despite a potential bias of market timing. Ideally governance, finance and operational improvements should explain value creation in company *i* acquired at time *t* using the answers from the questionnaire as proxies:

$$IRR_{it} = \beta_1 \mathbf{G}_{it} + \beta_2 \mathbf{F}_{it} + \beta_3 \mathbf{O}_{it} + \beta_4 \mathbf{X}_{it} + \gamma_t + e_{it}$$

where **G** is a vector of Governance related variables, **F** is a vector of Finance related variables, **O** is a vector of operational related variables, **X** is a vector of control variables, γ is year fixed effects and *e* is the error term. The variables included in **G** are *active ownership*, *alignments of interests* and *unincentivized tasks*. The variables contained in **F** are *capital structure* and *free cash flow & capital expenditure*. Operational variables **O**, count *operational partner*, *change in management*, *inorganic changes* and *long-term projects*. Finally **X** controls for *enterprise value*, *fund size*, *deal type*, *still PE owned* (if IRR are realized or expected) and *years of ownership*. The year fixed effects captures unobserved effects related to the year of acquisition.

A challenge of the independent variables is their relative importance, as the fund may use several tools for value creation, but mainly one of the drivers is responsible for the return. Using the CEOs relative weighting of the drivers and defining a high relative score of the driver when rated above the 75th percentile dummy variables can be created and included in a specification of the model. The variables related to relative importance will be denoted RI.

Running a multiple regression analysis on the data is however not straight forward. Due to missing information regarding IRR for four companies and four companies represented by two CEOs, data contains 46 responses, which despite of a relative high response rate of 48.6% is a small sample. The dependent variable IRR is in intervals and the explanatory variables are categorical and of ordinal type, meaning that assigning the responses a value from 1-5 does not mean that the distance from 1 to 2 (e.g. None to Low) is the same as the distance from 4 to 5 (e.g. High to Very High). The most appropriate way of treating the dependent variable is to use interval regression (Intreg) which is an ordered probit model with fixed cut points estimating the marginal effects by maximum likelihood. However, a simpler way could be to create an artificial dependent variable taking on

values from the midpoints of the IRR intervals and estimating the model by ordinary least squares (OLS).

A categorical variable with J categories should be included in a regression model as a set of J-1 dummy variables. The reference category is excluded and the included indicators are interpreted relative to the excluded category. [52] Hence, optimally, the challenge of ordinal independent variables can be solved by creating dummies for each response possibility, but due to the sample size this will not be possible for each level. Instead, a dummy indicating low versus high values can be made.

Another possibility is to make the strong assumption that a one-unit increase in the ordinal variables has a constant effect on IRR, and rather than including four dummies include the variables taking values 1-5. The simplicity comes at a costs as by doing so, one make a strong assumption that successive categories of the ordinal independent variable are equally spaced, which may not be the case. The only variable, for which it is appropriate to include as interval, is *years of ownership*, as there by the definition of years will be equally distance between 2-3 years, 4-5 years and 6-7 years.

The statistical software package STATA will be used for the purpose of estimating the model using the various specifications mentioned above. The technical details of the estimation techniques will be covered in the next section.

4.1 Ordinary least squares (OLS) estimation

For linear regression models OLS can be used to estimate the parameters. Using the simple linear regression model:

$$\hat{y} = \hat{\beta}_0 + \hat{\beta}_1 x_1 + u$$

The method of OLS chooses the estimates of the parameters β_0 and β_1 to minimize the sum of the squared residuals:

$$\boldsymbol{min} \sum_{i=1}^{n} (y_i - \hat{\beta}_0 - \hat{\beta}_1 x_1)^2$$

[52] Long & Freese (2006) page 415

OLS estimation relies on the Gauss-Markov assumptions in order to be unbiased:

- Linear in parameters: $y = \beta_0 + \beta_1 x_1 + u$
- Random sampling
- No perfect collinearity: None of the independent variables is constant and there is no exact linear relationship among the independent variables.
- Zero conditional mean: $E(u|x) = 0$
- Homoskedasticity: In a multiple regression framework, the error should have the same variance given any value of the explanatory variables. $Var(u|x_1, x_2, ..., x_k) = \sigma^2$

If the OLS estimator satisfies those assumptions, it is said to be the best linear unbiased estimator. [53]

The conditions for OLS to consistently estimate the βj is that the error term has zero mean and is uncorrelated with the regressors and that there is no exact linear relationship among the regressors. This is the case under the zero conditional mean assumption: $E(u|x) = 0$ and there is no perfect collinearity among the axplanatory variables. An important distinction is whether the explanatory variables are exogenous hence uncorrelated with the error term fulfilling the zero conditional mean assumption, or if the explanatory variables are endogenous, hence correlated with the error term. Endogeneity typically comes from omitted variables, measurement error and simultaneity. [54]

R-squared is a measure of the Goodness-of-fit and can be interpreted as the fraction of sample variation in y that is explained by x:

$$R^2 = \frac{SSE}{SST}$$

Where $SST = SSE + SSR$ and given by:

The total sum of squares: $SST = \sum_{i=1}^{n} (y_i - \bar{y})^2$

The explained sum of squares: $SSE = \sum_{i=1}^{n} (\hat{y}_i - \bar{y})^2$

The residual sum of squares: $SSR = \sum_{i=1}^{n} \hat{u}_i^2$

[53] Wooldridge (2009) pages 84-87 & 102-105
[54] Wooldridge (2002) pages 49-50

One drawback of r-squared is that it never decreases when additional independent variables are added to a regression, making r-squared a poor tool when deciding whether an explanatory variable belongs in a model.[55]

4.2 Interval regression – ordered probit estimation

Interval regression is a maximum likelihood estimation of an ordered probit model with fixed cut point. If IRR were observed OLS could be used to estimate the parameters, but since IRR is interval-coded, it can only be observed if IRR falls into one of several intervals. Also, it cannot be concluded, that the difference between having IRR lower than 15% and IRR between 15-25% is twice the difference between IRR of 15-25% and IRR greater than 35%, which would be the case if assigning a value to each interval. The censored regression model deals with the problem of missing data on the response variable by taking into account that the values of the response variable are above or below some given threshold when estimating the parameters. The ordered probit model is an ordered response model suitable for this kind of data issues. [56]

4.2.1 The probit model

The probit model is a special case of binary response models and can be derived from the latent variable formulation when the error term *e*, has a standard normal distribution:

$y^* = \mathbf{x}\boldsymbol{\beta} + e$, where $y = 1[y^* > 0]$

For binary response models, the primary interest lies in the response probability:

$$p(\mathbf{x}) \equiv P(y = 1|\mathbf{x}) = P(y = 1|x_1, x_2, ..., x_K)$$

Hence, we want to explain the effects of x_j on the response probability. The probit model is an index model because it restricts the way in which the response probability depends on *x*:

$$P(y = 1|\mathbf{x}) = G(\mathbf{x}\boldsymbol{\beta}) \equiv p(\mathbf{x})$$

where p(**x**) is a function of **x** only through the index $\mathbf{x}\boldsymbol{\beta} = \beta_0 + \beta_1 x_1 + \beta_2 x_1 + ... + \beta_K x_K$. The function G maps the index to the response probability and is a cumulative distribution function (cdf).

[55] Wooldridge (2009) page 81
[56] Wooldridge (2009) pages 575-581

$$G(z) \equiv \Phi(z) \equiv \int_{-\infty}^{z} \phi(v)dv$$

In the probit model Φ is the standard normal cumulative distribution function (cdf) ensuring that the response probability is strictly between zero and one and ϕ(z) is the standard normal density:

$$\phi(z) = (2\pi)^{-1/2} \exp(-z^2/2)$$

As mentioned above, maximum likelihood estimation can be used to estimate the parameters of a probit model. Maximum likelihood estimates are the values of the parameters that have the greatest likelihood of generating the observed data. Maximum likelihood estimation is based on the distribution of *y* given *x* and can be derived from the density of *y* given *x*[57]:

$$f(y|x;\beta) = \left[G(X_i\beta)\right]^{y}\left[1-G(X_i\beta)\right]^{1-y}, y = 0,1$$

By taking the log of the density function, the log-likelihood function for observation *i* is a function of the parameters β and the data (x,y):

$$\ell_i(\beta) = y_i \log\left[G(\mathbf{x}_i\beta)\right] + (1-y_i)\log\left[1-G(\mathbf{x}_i\beta)\right]$$

The log-likelihood of a sample size *N* is $\ell(\beta) = \sum_{i=1}^{N} \ell_i(\beta)$ and the maximum likelihood estimator of β maximizes this likelihood. The sign of the effect of x_j on p(**x**) is given by the sign of β_j.[58]

4.2.2 The ordered probit model

Similar to the probit model, the ordered probit model can be derived by a latent variable determined by:

$y^* = x\beta + e$, where $e|x \sim Normal(0,1)$

Defining the interval limits as $a_1 < a_2 < \ldots < a_J$ and

$y = 0$ if $y^* \le a_1$

$y = 1$ if $a_1 < y^* \le a_2$

$\vdots$

$y = J$ if $y^* > a_J$

[57] Wooldridge (2009) pages 578-580
[58] Wooldridge (2002) pages 457-461

The parameters can be consistently estimated by making a distributional assumption. The model assumes that y conditional on x is normally distributed and that the variance of y does not depend on x: $y^*|X \sim Normal(X\beta, \sigma^2)$, where $\sigma^2 = Var(y^*|X)$

The conditional distribution of y given x can be derived by computing each response probability:

$$P(y=0|\mathbf{X}) = P(y^* \le \alpha_1|\mathbf{X}) = P(\mathbf{X\beta} + e \le \alpha_1|\mathbf{X}) = \Phi(\alpha_1 - \mathbf{X\beta})$$

$$P(y=1|\mathbf{X}) = P(\alpha_1 < y^* \le \alpha_2|\mathbf{X}) = \Phi(\alpha_2 - \mathbf{X\beta}) - \Phi(\alpha_1 - \mathbf{X\beta})$$

$$\vdots$$

$$P(y=J|\mathbf{X}) = P(y^* > \alpha_J|\mathbf{X}) = 1 - \Phi(\alpha_J - \mathbf{X\beta})$$

Finally the parameters of β and σ^2 can be estimated using maximum likelihood. For each *i*, the log-likelihood function is given by:

$$\ell_i(\boldsymbol{\alpha}, \boldsymbol{\beta}) = 1[y_i = 0]\log[\Phi(\alpha_1 - \mathbf{x}_i\boldsymbol{\beta})] + 1[y_i = 1]\log[\Phi(\alpha_2 - \mathbf{x}_i\boldsymbol{\beta}) - \Phi(\alpha_1 - \mathbf{x}_i\boldsymbol{\beta})] + \ldots + 1[y_i = J]\log[1 - \Phi(\alpha_J - \mathbf{x}_i\boldsymbol{\beta})]$$

The maximum likelihood estimator maximizes the likelihood for all observations and β_j are interpretable as if we had observed y_i^* for each *i* and estimated $E(y|\mathbf{X}) = \mathbf{X\beta}$ by OLS. Our ability to estimate the partial effects of the x_j is due to the strong assumption that y* given X satisfy the classical linear model assumptions. Without these assumptions, the estimator of β would be inconsistent.[59]

4.2.3 Maximum likelihood estimation and goodness-of-fit measures

The model estimates obtained through maximum likelihood estimation comes from an iterative process. The likelihood ratio (LR) test is useful to tests the differences in the log-likelihood functions for the full model or unrestricted model and the restricted model when excluding variables and the statistic is given by:

$$LR = 2(\mathscr{L}_{ur} - \mathscr{L}_r)$$

where $\mathscr{L}_{ur}$ and $\mathscr{L}_r$ is the log-likelihood value for the unrestricted and restricted model respectively. STATA uses the likelihood ratio to test that at least one of the explanatory variables is not equal to zero.

[59] Wooldridge (2002) pages 504-509

As the estimates are not calculated to minimize variance the r-squared from OLS does not apply. However, percentage correctly predicted can be used as a measure of goodness-of fit and thereby the pseudo R-squared will mimic R-squared by ranging from 0 to 1 with higher values indicating a better fit. In the analysis three pseudo R-squared measures are used:

McFadden's : $R^2 = 1 - \frac{\mathscr{L}_{ur}}{\mathscr{L}_0}$

Hence, the r-squared treats the log likelihood of the model with only an intercept as the total sum of squares, and the log likelihood of the full model as the sum of squared errors. The ratio of the likelihoods indicates the level of improvement over the intercept model and will be between zero and one.

Adjusted McFadden's : $R^2 = 1 - \frac{\mathscr{L}_{ur} - K}{\mathscr{L}_0}$,

where K is the number of parameters. Adjusted McFadden penalizes the model for including too many explanatory variables as the value of adjusted McFadden will decrease if the additional predictor does not add sufficiently to the model and it is possible to obtain negative values.

Cox & Snell (ml): $R^2 = 1 - \left[\frac{\mathscr{L}_{ur}}{\mathscr{L}_0}\right]^{2/n}$

The ratio of the likelihoods reflects the improvement of the full model over the intercept model and the n'th rooth provides an estimate of the log-likelihood of each y value. The intuition behind this measure is that the log-likelihood is the conditional probabilities of the dependent variable given the independent variables and with *N* observation the log-likelihood is the product of *N* probabilities.

Several more pseudo r-squared measures exist but three complementary measures should be sufficient to obtain an indication on the relative goodness-of-fit among the various specifications of the model. Finally, the goodness-of-fit is not as important as statistical and economic significance of the explanatory variables.[60]

[60] Wooldridge (2002) page 465

4.2.4 Fixed effects

In the model, year fixed effects are included by defining dummy variables for the year of acquisition in the cross section 2004&2005, 2006 and 2007. The first years 2004 and 2005 are both included in the constant as there are only three observations from 2004 in the data set. Including fixed effects allow for arbitrarily correlation between the unobserved effect and the explanatory variables. The fixed effects are allowed to be correlated with the explanatory variables, which on the other hand need to be time-varying.

4.2.5 Including irrelevant variables

A model is said to be overspecified when one or more of the independent variables included in the model has no partial effect on the dependent variable. Including irrelevant variables does not make the OLS estimators biased. However, adding an irrelevant variable to an equation generally increases the variance of the OLS estimators because of multicollinearity.[61]

4.2.6 Omitted variables

The impact of underspecifying a model by omitting an important factor will depend on whether the omitted variable is correlated with any of the explanatory variables. If the omitted variable is correlated with any of the regressors, then the omitted variable captured by the error term, will cause the error term to be correlated with the regressors. Hence there will be an endogeneity problem, causes the conditional mean assumption to fail and the OLS estimator to be inconsistent.[62] In the case of probit, omitted variables uncorrelated with the explanatory variables also known as the neglected heterogeneity problem, causes an attenuation bias when estimating the parameters. Hence, even if the omitted variables are uncorrelated with the regressors the probit coefficients are inconsistent, making omitted variables a more serious problem in a probit analysis. However, probit will still work for the purpose of obtaining the directions of the effects or the relative effects of the explanatory variables.[63]

[61] Wooldridge (2009) page 89
[62] Wooldridge (2002) pages 61-63
[63] Wooldridge (2002) pages 470-472

4.2.7 Measurement error

The impact of measurement error in the dependent variable will depend on the relation of the measurement error with the independent variables. Assuming that the measurement error is independent of each explanatory variable implies that the measurement error is uncorrelated with the regressors, and OLS will consistently estimate the equation, though resulting in a larger error variance. If the measurement error is related to one or more of the explanatory variables it will cause bias in OLS.[64]

Measurement error in explanatory variables such that we observe *x'* rather than *x*, and the difference between *x* and *x'* being the measurement error. It is important to distinguish between whether the measurement error is uncorrelated with the observed measure of the variable *x'*, or the unobserved variable *x*. If the measurement error is uncorrelated with the observed variable, then the measurement error will be correlated with the unobserved variable *x*. OLS will still consistently estimate the parameters though error variance will increase. However, if the measurement error is correlated with the observed variable it will cause attenuation bias in OLS and create inconsistent estimates of the parameters.[65]

4.2.8 Simultaneity

Simultaneity arises when at least one of the explanatory variables is determined simultaneously with the dependent variable. An explanatory variable which are determined simultaneously with the dependent variable is generally correlated with the error term, causing problems endogeneity which leads to bias and inconsistency in OLS.[66]

4.2.9 Sample selection

A selected sample implies that the sample is nonrandom. Selection mechanisms can be due to sample design or the behavior of the units being sampled. When deciding whether sample selection can be ignored, one needs to distinguish between exogenous and endogenous sample selection.

Defining a selection indicator s_i for each i by $s_i = 1$ if we observed all of (y_i, x_i), and $s_i = 0$ otherwise. The statistical properties of the OLS estimators given the selected sample is of interest. Rather than

[64] Wooldridge (2002) pages 71-73
[65] Wooldridge (2002) pages 73-76
[66] Wooldridge (2009) pages 548-552

effectively estimating *y* as a function of *x* we can only estimate $s_i y_i = s_i x_i \beta + s_i u_i$. For the OLS estimator to be unbiased we need the zero conditional mean assumption $E(su|sx_1,...,sx_k) = 0$. If the sample selection is exogenous, meaning that *s* is only a function of the explanatory variables, then sx_j is just a function of $x_1, x_2, \ldots, x_3$ and uncorrelated with *u*. If the selection bias is endogenous such that *s* depends on *u*, OLS will not consistently estimate the parameters. The same is true for maximum likelihood estimation of probit models. [67]

4.2.10 Heteroskedasticity

The homoscedasticity for OLS assumes that the variance of the error term, conditional on *x* is constant. When the error variance depends on *x*, the error term is said to exhibit heteroskedasticity. Heteroskedasticity does not cause the OLS estimator to be unbiased and inconsistent and the goodness-of-fit measure is also unaffected by the presence of heteroskedasticity. However, the variance of the parameters is effected by heteroskedasticity and the t-tests and f-tests used to test hypotheses are not valid under heteroskedasticity.

Therefore, when estimating the model, the specifications will be run using the robust function in STATA. There will be no loss of doing so, as heteroskedasticity-robust standard errors are asymptotically valid in the presence of any kind of heteroskedasticity, including homoscedasticity.[68]

[67] Wooldridge (2009) pages 606-608
[68] Wooldridge (2002) page 57

5. Hypothesis

The table below summarizes the expected impact of each variable on value creation.

Table 1: Hypothesis

Variable	Impact	Reason
Panel A		
Active ownership	Positive	Interaction with fund manager, the board structure and frequency of board meeting should facilitate faster decision making resulting in a positive impact on value creation.
Alignment of interests	Positive	Alignment of interests through the design of compensation schemes, bonuses, warrants and other personal benefits should mitigate agency costs and have a positive impact on value creation.
Unincentivized tasks	Negative	If the incentivized objectives come at a cost for unincentivized tasks such as commitment to clients, suppliers and employees it is expected to have a negative impact on value creation.
Capital structure	Positive	Optimizing capital structure is expected to lower the cost of capital and thereby increasing the return on the investment. Behind this expectation is an implicit assumption, that the companies prior to private equity ownership have had a too small fraction of debt. Having a private equity fund as owner may help the company gain access to capital either through better lending reputation with the banks or from the fund investing more money in the company if needed. Also an optimal capital structure should lower the costs of free cash flow. However, if the fund fails to optimize the capital structure resulting in too much leverage, it may limit the operations of the company resulting in a negative impact on value creation.
FCF & CAPEX	Positive	Optimizing the free cash flow and capital expenditures should decrease costs and thereby increase value. Free cash flow is cash available for distribution among debt and equity holders.

		Increasing operational liquidity through networking capital and putting an upper bound on CAPEX forcing only the highest return investments to be initiated should have a positive impact on value creation.
Operational partner/team	Positive	An operational partner/team supporting the company on a regular basis by bringing in industry knowledge and experiences from other portfolio companies is expected to have a positive impact on value creation.
Change in management (Prior year 1)	Positive	Replacing the management during the first year of ownership can be a way of adding operational capabilities to the company and is expected to have a positive impact. One caution is that replacing existing management may cause a loss of knowledge, if the manager has lot of company specific knowledge not shared with his employees.
Change in management (Post year 1)	Negative	Changing the management after the first year of ownership may indicate lack of performance and be a way of enforcing corporate governance. Private equity owned companies appear to have a higher frequency in management change than public companies and the funds does not hesitate to replace a manager who is not performing. The coefficient is therefore expected to be negative, as the fund will change management in companies which are not performing well.
Inorganic changes	Positive	Inorganic changes are expected to have a positive impact on value creation. E.g. acquiring a company and thereby obtaining access to new markets, new knowledge, scale etc. or divesting an unprofitable division should increase overall profitability of the company.
Long-term projects	Negative	If long-term content project (>5 years) suffers while under private equity ownership, the future outlook of the company will worsen and have an adverse impact on value creation.

Panel B

Fund size	Positive	A larger fund will have a larger investment team, and thereby access to a larger network and constitute a competitive advantage in the selection process of potential target companies. Also, a larger fund may have better track record as good results will induce sophisticated investors to allocate more money to that fund and be an advantage in terms of credit facilities with banks. Finally, larger funds may enjoy economies of scale, as management fees are stable around 1-2% regardless of fund size.
Enterprise value	Ambiguous	From a theoretical point of view there should be no differences among small and large companies as it would be possible to arbitrage on deals of certain sizes if that was the case. However, empirical work show results favoring larger companies, and enterprise value is therefore included in the model to test if that is the case. A larger company will be more robust to decreasing sales in local markets and when selling in several currencies a large company will have a natural hedge against currency fluctuations. A large company will, ceteris paribus, have stronger negotiation and contracting power with suppliers and clients making a larger company less exposed to short term demand fluctuations. On the other hand a smaller company may be less complex, easier to change and scale opportunities potentially larger.
Deal type	Ambiguous	From a theoretical perspective there should be no differences among deal types, using the same argumentation as for enterprise value. However, it could be that drivers of value creation differ among deal type such that controlling for deal type is important.
Relative importance	Negative	If the CEO has indicated that either governance, finance, operations or multiple expansions has been the main driver of value creation as opposed to the fund using a mix of value drivers it is expected to have a negative impact on value creation.

Still PE owned	Negative	The impact will be negative if the funds do not realize negative returns but hope to improve them combined with a longer holding period as still PE owned companies will have been private equity held for minimum 5 years.
Years of ownership	Ambiguous	Years of ownership is a trade-off between on the one hand cost of capital as time-value-of-money calls for a convex increase in value creation to off-set compound return while on the other hand the transition of a company through strategic and operational changes takes at least several years.

6. Results

Table 2 and table 3 below summarize the responses from the CEOs.

Table 2: Summary of ownership

Holding period	0-1 years	2-3 years	4-5 years	6-7 years	>7 years
#	1	4	28	13	4

Still PE owned	Yes:	No:
#	32	18

Enterprise Value	DKK 0-100m	DKK 0.1-1 bn	DKK 1-5 bn	> DKK 5bn	Unknown
#	18	22	7	1	2

IRR	<0%	0-15%	15-25%	25-35%	>35%
#	1	5	21	10	9

It appears that holding period is spread equally among the intervals, with a typical time frame of 4-7 years. Approximately one-third of the companies are exited and two-thirds of the companies are still under private equity ownership. Enterprise value show an overweight of companies worth less than 1bn DKK, indicating that the intervals available for the CEOs has not been appropriate chosen for the purpose. Finally IRR show responses in all intervals, such that the sample represent highly profitably deals as well as less profitably deals, though the right tale is heavier than the left, suggesting the higher interval would have been informative.

In the table below, the answers related to the qualitative questions have been summarized using a scale of 1-5 rather than the wording (e.g. None, Low, Medium, High, Very High) as the wording was not identical for all questions. The wording was used in the questionnaire as it may be easier for the respondents to relate to actual meanings rather than a scale of numbers. Without loss of information, the responses have been converted to a scale from 1-5 in order to give an overview of the responses. For further examination of the questions, please refer to appendix 1.

Table 3: Qualitative answers

	(1)	(2)	(3)	(4)	(5)	Total	Mean	Median
PE vs. previous ownership	1	4	16	24	4	49	3.54	4
Capital structure	2	5	16	22	5	50	3.48	4
FCF &CAPEX	3	4	17	20	6	50	3.47	4
Alignment of interests	1	9	14	22	4	50	3.40	4
Active ownership	1	8	17	20	4	50	3.37	3
Financial crisis	3	13	17	12	4	49	3.04	3
Risk taking	3	9	35	1	2	50	2.83	3
Inorganic changes	19	7	12	11	1	50	2.38	2
Unincentivized tasks	13	16	13	7	1	50	2.34	2
Operational partner	17	18	10	3	2	50	2.11	2
Long-term projects	20	16	11	3	0	50	1.95	2

There appears to be consensus among the respondents that *active ownership, alignment of incentives, capital structure, free cash flow & capital expenditures* is important drivers of value creation. *Risk taking* (3 = same) seems unchanged and *long-term projects* as well as *unincentivised tasks* are in general unaffected by the ownership. On the other hand, the fund as an *operational partn*er is rated of low importance. The results of *inorganic growth* and the impact of the *financial crisis* are mixed. Finally, *PE vs. previous ownership* indicates that an overweight of CEOs state that the private equity ownership has generated more value for the company compared to its previous ownership structure.

Indicating *active ownership, alignment of incentives, capital structure, free cash flow & capital expenditures* as important drivers of value should not be surprisingly, as it is the classical private equity competencies within corporate governance and corporate finance. More surprisingly, only a few CEOs indicate that the fund have an operational partner or team bringing in operational capabilities such as industry knowledge and experience from other portfolio companies supporting the company on a regular basis.

A potentially important parameter is change in management. Using Greens Database and company announcements, management changes for each company in the sample has been identified and indicator variables for management change during the total holding period and during the first year of ownership has been made. Within the sample, 52% of the management has been replaced during the first year of ownership and 34% are replaced at some point after the first year of ownership. Management turnover are high compared to the findings of Acharya et al who report that 39% of the deals have CEO replacement within the first 100 days and 69% have replacement at some point during the ownership.[69]

The data represent portfolio companies owned by 22 different private equity funds. The funds are classified after size, with funds having committed capital of more than DKK 5 billion being large, meaning that 50% of the companies were/are held by a large fund and 50% were/are held by a small fund. In addition, deal type has been included. A growth company is defined as a company with more than 20% annual sales growth, a turn-around is a company with negative/very low earnings before acquisition and stable cash flow account for the rest of the deals with stable earnings. In the sample, 22% of the deals are growth, 22% are turn-around and 56% are stable cash flow deals.

Using qualitative variables lack the possibility of including relative importance of the variables, in the sense that the CEOs may find several drivers important for value creation but in the end only one set of value creation drivers were responsible for value creation. In order to take this into account, the CEOs were asked to indicate the relative importance by dividing 100% among four value drivers:

- Governance: Concentrated ownership, more active board of directors and better incentive schemes
- Finance: Improvement of free cash flow, optimization of capital expenditures, higher leverage and access to capital
- Operational: The fund as a sparring partner, a long-term perspective and time-out from quarterly reporting, growth initiatives, improvement of efficiency
- Multiple expansion: Market timing and negotiation skills attributed to fund managers

[69] Acharya et al (2009) page 32

The table below summarizes the relative importance of the four drivers.

Table 4: Relative importance of value drivers

Percentile	**25th**	**50th**	**75th**	**Mean**
Governance	19%	30%	40%	30%
Finance	20%	25%	31%	30%
Operational	10%	25%	31%	23%
Multiple	10%	15%	25%	17%

It appears that the CEOs in general assign highest relative importance to governance related value drivers followed by finance, operational and multiple. The mean of the finance related measures are much higher than the median, indicating potential outliers.

The relative importance measures of the value drivers are not consistent with the scores of table 3, which show a much higher rating of the finance and governance related questions compared to the operational related questions, indicating that the questionnaire has an omitted variable bias or measurement error related to operational value drivers.

7. Descriptive statistic

IRR is of particular interest and can be used as a measure of value creation, with the caveat that market conditions distort IRR and make it dependent on acquisition and exit timing. The IRRs appear to be normally distributed around the mean as shown in figure 6 below. It is important that IRRs on different levels are represented in the sample, and this would not be the case if the sample was self-selected and only CEOs of high return companies had chosen to answer the questions. IRR can be decomposed into realized and expected returns as part of the sample consists of companies still under private equity ownership.

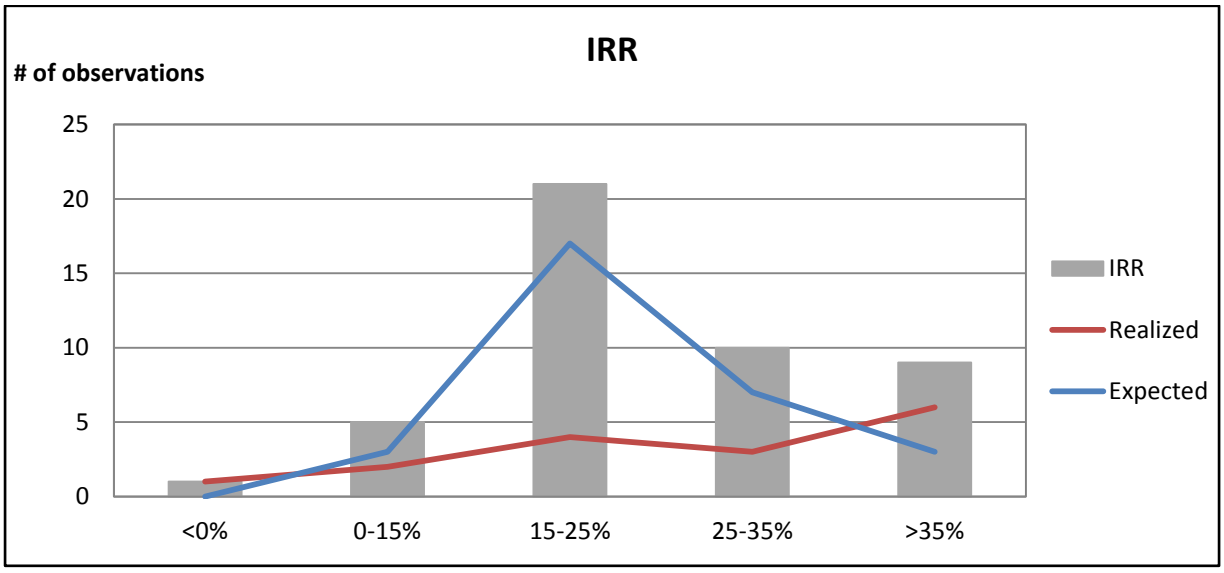

Figure 6: Distribution of IRR

A challenge of IRR is that the distributions among exited deals, measured by realized returns is not the same as the distribution from companies still under private equity ownership indicating expected returns. Responses from CEOs of companies still under private equity ownership converge toward the middle interval of returns between 15-25%. It may be that CEOs of poorly performing companies are more optimistic thinking that the return will increase and that CEOs of high performing companies are more conservative not certain that the high performance will continue. There will therefore be a measurement error in the dependent variable causing an attenuation bias in the coefficients.

Ideally, value creation measured by IRR can be explained as a function of governance, finance and operational improvements, measured by the qualitative variables from the questionnaire. As mentioned above, the data set imposes challenges of the dependent variable being censored in intervals and the independent variables being categorical and of ordinal type. As a starting point the data is therefore examined descriptively by splitting the sample into two groups – high return companies with IRR larger than 25% and low return companies with IRR less than 25%. The purpose is to test whether low and high return companies differ in their responses to the questionnaire. In table 5 below, the mean for each categorical variable is tested for the two groups using a t-test with unequal variance testing the hypothesis:

H_0: $\mu(IRR_{<25\%}) = \mu(IRR_{>25\%})$

H_a: $\mu(IRR_{<25\%}) < \mu(IRR_{>25\%})$ or $\mu(IRR_{<25\%}) > \mu(IRR_{>25\%})$

$$t = \frac{\Delta\hat{x} - \Delta x}{se} = \frac{(\bar{x}_1 - \bar{x}_2) - 0}{se}, \; se = \sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n2}}$$

Table 5: Low vs. high IRR companies

	IRR<25%	IRR>25%	Difference	t-test	p value
Panel A					
Years of ownership	3.33	3.32	-0.02	0.068	0.473
Still PE-owned	0.74	0.53	-0.21	1.471	0.075*
Enterprise Value	1.70	2.00	0.30	-1.236	0.113
Active ownership	3.30	3.39	0.10	-0.333	0.370
Alignment of interests	3.26	3.42	0.16	-0.580	0.283
Unincentivized tasks	2.70	2.00	-0.70	2.322	0.013**
Risk taking	2.78	2.87	0.09	-0.403	0.345
Capital structure	3.56	3.42	-0.13	0.483	0.316
FCF &CAPEX	3.56	3.45	-0.11	0.344	0.366
Operational partner	2.37	1.87	-0.50	1.624	0.056*
Inorganic changes	2.33	2.53	0.19	-0.495	0.312
Long-term project	1.94	2.05	0.11	-0.370	0.357
Financial crisis	2.91	3.14	0.23	-0.729	0.235
PE vs. previous ownership	3.41	3.58	0.18	-0.685	0.249

Panel B					
Change in management (<Y1)	0.52	0.32	-0.20	0.641	0.263
Change in management (>Y1)	0.41	0.42	0.01	0.628	0.267
Fund Size	0.41	0.63	0.22	-1.504	0.070*
Growth	0.19	0.26	0.08	-0.606	0.274
Stable CF	0.59	0.47	-0.12	0.782	0.220
Turn-around	0.22	0.26	0.04	-0.310	0.379

* p<0.10, ** p<0.05, *** p<0.010

Table 5 panel A shows the mean values of the questionnaire presented in table 2 and 3 above, for the 27 low-return and 19 high-return companies respectively. *Years of ownership* is assigned values from 1-5 (0-1 years to >7 years) like the qualitative variables and *still under private equity ownership* is made as a dummy variable taking the value 1 if the company is still private equity held and zero otherwise. *Still PE owned* has a lower average for high-return companies than low-return companies suggesting that high-return companies have a higher percentage of exited investments than low-return companies. *Unincentivized tasks* has a significant higher average value for low return companies compared to high return companies, meaning that for low return companies, the strong incentives for reaching certain objectives, to a larger extend comes at a cost for other core tasks not included in the compensation linked objectives, than for the high return companies. Similar, low-return companies have a higher average on *operational partner* than high-return companies. This is opposed to expectations, as the fund as an operational partner was thought to have a positive impact on value creation.

Panel B in table 5 contains dummies for *change in management* during the first year and after the first year, *fund size* and *deal type* indicating whether the transaction has been a growth case, turn-around or stable cash flow. *Fund size* is the only variable in panel B which has significant different mean for low- and high return companies. *Fund size* takes the value 1 if the fund is larger than DKK 5 billion and zero otherwise, indicating that high-return companies are owned by larger funds. *Change in management prior year 1* takes the value 1 if the CEO has been replaced during the first year of ownership and similar *change in management post year 1* takes the value 1 if the CEO has been replaced within the first year. *Enterprise value* is slightly larger for high return deals though

not significantly different. A *growth* company is in this thesis defined as a company with more than 20% annual sales growth in the years prior to the acquisition, a *turn-around* is a company with negative or very low earnings before acquisition and stable cash flow account for the rest of the deals with stable earnings. None of the deal type indicators show significantly differences between high and low return deals.

Testing mean difference for 20 parameters between the two groups results in only 4 significantly different means. When sample sizes are small (N_1<30 or N_2 <30), one cannot rely on the central limit theorem, meaning that for small samples, the assumption of the sample mean being normally distributed may be important. However, a two-sided inference is robust against violations of the normal distribution as opposed to a one-sided test, but this would only make the p-values higher and not improve the significance of the results.[70]

As illustrated in figure 6, the distribution of IRR among companies still under private equity ownership and exited companies differ. It will therefore also be important to test whether they differs in their responses to the rest of the questions. A similar exercise is therefore done comparing companies still under private equity ownership and exited companies.

[70] Agresti & Franklin (2009) pages 437 & 485

Table 6: Exited vs. still PE owned companies

	Exited	Still PE	Difference	t-test	p value
Panel A					
IRR	0.25	0.23	-0.02	0.657	0.259
Years of ownership	2.89	3.53	0.64	-2.871	0.003***
Enterprise Value	1.89	1.77	-0.12	0.497	0.311
Active ownership	3.33	3.39	0.06	-0.198	0.422
Alignment of interests	3.61	3.28	-0.33	1.206	0.118
Unincentivized tasks	2.28	2.38	0.10	-0.319	0.376
Risk taking	2.86	2.81	-0.05	0.228	0.411
Capital structure	3.08	3.70	0.62	-2.278	0.015**
FCF &CAPEX	3.31	3.56	0.26	-0.755	0.229
Operational partner	1.89	2.23	0.35	-1.179	0.122
Inorganic changes	2.25	2.45	0.20	-0.559	0.290
Long-term project	2.08	1.88	-0.21	0.735	0.234
Financial crisis	2.82	3.16	0.33	-1.114	0.136
PE vs. previous ownership	3.41	3.61	0.20	-0.690	0.249
Panel B					
Change in management (<Y1)	0.50	0.53	0.03	0.207	0.419
Change in management (>Y1)	0.22	0.41	0.18	1.374	0.124
Fund Size	0.61	0.44	-0.17	1.173	0.124
Growth	0.22	0.22	0.00	-0.028	0.489
Stable CF	0.67	0.50	-0.17	-1.146	0.129
Turn-around	0.11	0.28	0.17	1.532	0.066*

* p<0.10, ** p<0.05, *** p<0.010

Table 6 shows that companies still under private equity ownership have a longer holding period of 5.5 years compared to exited companies with an average holding period close to 4 years. In addition, capital structure is of higher importance among companies still under private equity ownership than those exited. Finally, there appears to be a larger fraction of turn-around deals which are still private equity held.

An important feature of the table is IRR. The sample mean between exited and still PE held companies are almost identical, though the distribution mapped in figure 6 differs. In the further analysis it is therefore important to take the marginal effect of IRR between the intervals into account as opposed to collapsing the intervals of IRR and using logit or probit, which will cause loss in the variation of IRR.

7.1 Key points

The strong incentives comes to a larger extend at a cost for *unincentivized tasks* for low IRR companies than high IRR companies. Similar, low IRR companies have a higher average on *operational partner* than high IRR companies. Finally, a larger fraction of high IRR companies are owned by larger funds compared to low IRR companies.

There is a lower fraction of still PE owned companies among high-IRR deal and among low IRR deal suggesting that high return companies have a higher percentage of exited investments than low return companies, though the relationship need not be causal but can be due to measurement bias in unrealized investments. However, companies still under private equity ownership have a longer holding period of 5.5 years compared to exited companies with an average holding period close to 4 years. Hence the results points towards private equity funds keeping poor performing investment longer, hoping to improve them.

IRR sample mean of exited and still PE held companies are almost identical, though the distribution mapped in figure 6 differs, making the variation in IRR as well as controlling for whether the company is still private equity held important.

8. Regression models

Several regressions are run and the results are reported in the tables below. Table 7 treats the categorical variables as interval running OLS and interval regressions with and without the control variables. Table 8 treats the categorical variables as dummies running OLS and interval regressions with and without control variables.

Table 7: OLS - Treating categorical variables as interval (1-5)

	(1) OLS	(2) OLS	(3) OLS	(4) OLS	(5) Intreg	(6) Intreg	(7) Intreg	(8) Intreg
Active ownership	0.029	0.035	0.021	0.024	0.027	0.039**	0.022	0.027
	(0.022)	(0.021)	(0.022)	(0.022)	(0.020)	(0.018)	(0.019)	(0.017)
Alignment of interests	0.003	-0.014	-0.008	-0.011	0.011	-0.006	0.001	-0.007
	(0.021)	(0.025)	(0.025)	(0.025)	(0.021)	(0.021)	(0.021)	(0.020)
Unincentivized tasks	-0.028**	-0.034**	-0.030*	-0.041**	-0.034***	-0.040***	-0.037***	-0.054***
	(0.013)	(0.013)	(0.015)	(0.016)	(0.012)	(0.012)	(0.014)	(0.014)
Capital structure	-0.005	-0.023	-0.015	-0.020	-0.008	-0.027	-0.009	-0.009
	(0.021)	(0.024)	(0.025)	(0.023)	(0.021)	(0.022)	(0.021)	(0.018)
FCF&CAPEX	-0.003	0.011	0.009	0.011	-0.002	0.012	0.003	0.009
	(0.017)	(0.020)	(0.020)	(0.021)	(0.018)	(0.018)	(0.018)	(0.019)
Operational partner	-0.035**	-0.038**	-0.037**	-0.041**	-0.046***	-0.054***	-0.049***	-0.054***
	(0.014)	(0.017)	(0.017)	(0.015)	(0.014)	(0.017)	(0.014)	(0.012)
Management change (Prior Year 1)	-0.037	-0.036	-0.048	-0.037	-0.043	-0.048*	-0.056**	-0.039*
	(0.032)	(0.031)	(0.029)	(0.027)	(0.031)	(0.029)	(0.025)	(0.022)
Management change (Post Year1)	0.007	0.021	0.029	0.021	-0.002	0.015	0.022	0.017
	(0.031)	(0.037)	(0.035)	(0.036)	(0.032)	(0.033)	(0.029)	(0.028)
Inorganic growth	0.008	-0.002	-0.003	-0.001	0.011	0.006	0.002	0.006
	(0.011)	(0.014)	(0.012)	(0.012)	(0.011)	(0.013)	(0.010)	(0.009)
Long-term projects	0.003	0.001	0.003	0.005	0.002	-0.004	-0.002	0.002
	(0.016)	(0.021)	(0.017)	(0.016)	(0.015)	(0.017)	(0.014)	(0.012)
Year 2006		0.028	0.024	0.063		0.011	-0.005	0.058
		(0.045)	(0.042)	(0.054)		(0.043)	(0.035)	(0.045)
Year 2007		0.029	0.037	0.068		0.036	0.032	0.082
		(0.053)	(0.052)	(0.066)		(0.049)	(0.044)	(0.053)
Enterprise value		0.053	0.052	0.031		0.035	0.049	0.020
		(0.051)	(0.049)	(0.049)		(0.051)	(0.045)	(0.042)
Fund size		0.067	0.076	0.086*		0.090*	0.084**	0.096***
		(0.050)	(0.050)	(0.047)		(0.047)	(0.041)	(0.037)
Growth		0.036	0.040	0.021		0.054	0.069	0.041
		(0.057)	(0.055)	(0.053)		(0.049)	(0.043)	(0.039)
Turn-around		0.012	0.016	0.020		0.026	0.033	0.041
		(0.034)	(0.037)	(0.037)		(0.034)	(0.030)	(0.027)
RI governance			0.014	-0.005			0.023	0.002
			(0.055)	(0.066)			(0.045)	(0.050)
RI finance			-0.057	-0.060			-0.072	-0.073
			(0.052)	(0.057)			(0.046)	(0.047)
RI operational			-0.034	-0.045			-0.033	-0.050
			(0.057)	(0.060)			(0.045)	(0.045)
RI multiple			-0.047	-0.046			-0.024	-0.025
			(0.050)	(0.050)			(0.040)	(0.038)
Still PE owned				-0.043				-0.087**
				(0.042)				(0.034)
Years of ownership				0.040				0.051**
				(0.025)				(0.020)
Constant	0.288***	0.306***	0.326***	0.242*	0.330***	0.331***	0.350***	0.229**
	(0.084)	(0.106)	(0.107)	(0.128)	(0.080)	(0.083)	(0.081)	(0.092)
Constant (lnsigma)					-2.521***	-2.660***	-2.772***	-2.867***
					(0.124)	(0.127)	(0.114)	(0.136)
N	46	46	46	46	46	46	46	46
r2	0.265	0.408	0.504	0.551				
r2_mf					0.143	0.227	0.291	0.347
r2_mfadj					-0.053	-0.067	-0.069	-0.045
r2_ml					0.316	0.453	0.538	0.603

Standard errors in parentheses
* p<0.10, ** p<0.05, *** p<0.010

Table 8: Treating categorical variables as ordinal using dummies

	(1) OLS	(2) OLS	(3) OLS	(4) OLS	(5) Intreg	(6) Intreg	(7) Intreg	(8) Intreg	(9) Intreg
Active ownership	-0.025	-0.054	-0.062	-0.064	-0.063	-0.133*	-0.138**	-0.094*	-0.090**
	(0.048)	(0.058)	(0.057)	(0.048)	(0.066)	(0.068)	(0.059)	(0.054)	(0.039)
Alignment of interests	0.052	0.026	0.053	0.063*	0.087**	0.065**	0.086***	0.076***	0.077***
	(0.038)	(0.047)	(0.040)	(0.036)	(0.041)	(0.033)	(0.029)	(0.025)	(0.024)
Unincentivized tasks	-0.038	-0.058**	-0.065**	-0.106***	-0.046*	-0.066***	-0.081***	-0.129***	-0.129***
	(0.028)	(0.027)	(0.028)	(0.025)	(0.027)	(0.023)	(0.023)	(0.023)	(0.023)
Capital structure	-0.077	-0.112*	-0.097	-0.129**	-0.130**	-0.235***	-0.159***	-0.145***	-0.146***
	(0.050)	(0.056)	(0.060)	(0.060)	(0.064)	(0.067)	(0.050)	(0.049)	(0.041)
FCF&CAPEX	0.043	0.089	0.088	0.088	0.089	0.199**	0.148***	0.133***	0.133***
	(0.058)	(0.065)	(0.061)	(0.061)	(0.068)	(0.078)	(0.051)	(0.049)	(0.037)
Operational partner	-0.021	-0.031	-0.044	-0.076***	-0.043	-0.066**	-0.069**	-0.101***	-0.100***
	(0.026)	(0.028)	(0.030)	(0.025)	(0.028)	(0.029)	(0.027)	(0.020)	(0.020)
Management change (Prior Year 1)	-0.020	-0.024	-0.046	-0.043*	-0.027	-0.027	-0.047*	-0.045**	-0.047***
	(0.031)	(0.029)	(0.031)	(0.025)	(0.030)	(0.028)	(0.025)	(0.019)	(0.017)
Management change (Post Year1)	-0.013	-0.010	0.003	-0.023	-0.033	-0.036	-0.018	-0.033*	-0.030
	(0.030)	(0.029)	(0.024)	(0.024)	(0.028)	(0.029)	(0.021)	(0.020)	(0.019)
Inorganic growth	0.012	-0.014	-0.015	-0.016	0.024	0.018	0.002	-0.002	
	(0.030)	(0.033)	(0.030)	(0.026)	(0.031)	(0.031)	(0.024)	(0.021)	
Long-term projects	0.023	0.015	0.034	0.045	0.028	0.033	0.046*	0.049**	0.047**
	(0.029)	(0.035)	(0.029)	(0.028)	(0.026)	(0.030)	(0.025)	(0.023)	(0.020)
Year 2006		0.075	0.078	0.130**		0.105**	0.082*	0.141***	0.135***
		(0.051)	(0.052)	(0.050)		(0.053)	(0.042)	(0.042)	(0.031)
Year 2007		0.057	0.102	0.150**		0.104*	0.115**	0.179***	0.173***
		(0.058)	(0.063)	(0.062)		(0.058)	(0.051)	(0.048)	(0.044)
Enterprise value		0.086*	0.092*	0.069*		0.057	0.079*	0.066**	0.069***
		(0.043)	(0.048)	(0.040)		(0.045)	(0.043)	(0.032)	(0.027)
Fund size		0.068	0.090*	0.124***		0.122***	0.122***	0.152***	0.150***
		(0.047)	(0.046)	(0.043)		(0.046)	(0.038)	(0.033)	(0.030)
Growth		-0.006	0.011	-0.012		-0.034	0.002	-0.012	
		(0.072)	(0.068)	(0.057)		(0.060)	(0.050)	(0.042)	
Turn-around		-0.019	-0.005	0.006		-0.040	-0.014	0.006	
		(0.041)	(0.037)	(0.031)		(0.039)	(0.032)	(0.027)	
RI governance			-0.027	-0.080*			0.002	-0.060*	-0.056
			(0.054)	(0.047)			(0.044)	(0.036)	(0.039)
RI finance			-0.099**	-0.135***			-0.106***	-0.141***	-0.139***
			(0.045)	(0.043)			(0.041)	(0.034)	(0.037)
RI operational			-0.091	-0.129**			-0.078*	-0.129***	-0.127***
			(0.055)	(0.047)			(0.042)	(0.033)	(0.034)
RI multiple			-0.082*	-0.092**			-0.040	-0.066**	-0.064**
			(0.043)	(0.033)			(0.034)	(0.026)	(0.028)
Still PE owned				-0.036				-0.073**	-0.069**
				(0.042)				(0.031)	(0.030)
Years of ownership				0.065***				0.073***	0.069***
				(0.017)				(0.015)	(0.015)
Constant	0.267***	0.241***	0.262***	0.119	0.309***	0.274***	0.295***	0.099	0.104
	(0.040)	(0.077)	(0.084)	(0.103)	(0.043)	(0.063)	(0.065)	(0.077)	(0.071)
Constant (lnsigma)					-2.475***	-2.699***	-2.912***	-3.094***	-3.088***
					(0.143)	(0.123)	(0.108)	(0.131)	(0.136)
N	46	46	46	46	46	46	46	46	46
r2	0.182	0.399	0.560	0.677					
r2_mf					0.115	0.252	0.367	0.468	0.466
r2_mfadj					-0.081	-0.042	0.007	0.076	0.122
r2_ml					0.264	0.489	0.623	0.712	0.710

Standard errors in parentheses
* p<0.10, ** p<0.05, *** p<0.010

Table 7 reports the results when treating the ordinal categorical variables as intervals, hence assuming that the distance from None to Low is the same as from High to Very High by assigning each qualitative variable with a number from 1-5. Columns 1-4 use the OLS regression taking the midpoint of the IRR intervals of 0%, 7.5%, 20%, 30% and 35%. The OLS regression has a low explanatory power with only two significant coefficient, *unincentivized tasks* and *operational partner*. R-squared increases significantly when including control variables, but the coefficients remain insignificant for most of the parameters.

Column 5-8 in table 7 use interval regression with intervals of <15%, 15-25% 25-35% and >35%, hence merging the two smallest IRR intervals from the questionnaire, as there are only one observation with negative IRR. The interval regressions have low explanatory power as well with most explanatory variables being insignificant, but similar to the OLS specification; the model improves significantly when including control variables increasing the goodness-of-fit measures though the majority of the parameters remain insignificant. Adjusted McFadden are negative for all specifications, indicating that the model contains too many variables compared to the explanatory power.

In table 8 the categorical variables are transformed to dummies taking the value 1 if the variable has a value equal to or greater than 3, hence the variable has medium to very high importance and 0 otherwise, i.e. when the variable has score 1-2 and thereby none-low importance. As described above, this is a necessary simplification, as it is not possible to include dummies for each level due to the sample size.

Table 8 columns 1-4 report results of OLS regressions using midpoints for IRR and dummies for the categorical variables. In column 1 none of the coefficients are significant. Similar to table 7, the model improves in column 2-4 when including control variables by increasing r-squared though many parameters remain insignificant. Columns 5-8 in table 8 use interval regression with intervals similar to those of table 7. The model turns out to be very suitable when including control variables in column 6-7, making the majority of the coefficients significant and improving the various goodness-of-fit measures, though adjusted McFadden is still close to zero.

When comparing OLS regression of table 7 and table 8, the model significantly improves in table 8 as more variables become significant and the explanatory power measured by r-squared increases. Similar, interval regression in table 8 show pronounced improvement compared to table 7 with the majority of the parameters being significant and the levels of the various r-measures indicating a better goodness-of-fit. For many of the variables in table 7 the sign of the coefficients are ambiguous across specifications while only two variables and two control parameters of table 8 show ambiguous signs on the parameters - that being *management change (prior year 1), inorganic growth* and *deal type.* In conclusion, interval regression is better suited for the data than OLS regression and it is evident, that treating the categorical variables as interval rather than ordinal is a too strong assumption.

Column 9 of table 8 is a fine tuning of the model dropping the highly insignificant variables *inorganic growth* and *deal type* resulting in a slight decrease in r-squared measured by McFadden and maximum likelihood but a large increase in adjusted McFadden indicating that the loss in explanatory power when excluding them are low compared the gain of reducing the model with three parameters. In conclusion, *inorganic growth* and *deal type* are redundant in the model.

9. Discussion of results

In the table below, the results from the regression analyses in table 8 are compared with the hypothesis.

Table 9: Expected vs. actual results

Variable	Expected	Actual	Comment
Panel A			
Active ownership	Positive	Negative	Active ownership where expected to have a positive impact on value creation, but is found to have a negative coefficient in the model.
Alignment of interests	Positive	Positive	Alignment of interests has a positive impact on value creation.
Unincentivized tasks	Negative	Negative	It has a negative impact on value creation if the incentivized objectives come at a cost for unincentivized tasks.
Capital structure	Positive	Negative	Capital structure where expected to have a positive impact on value creation, but is found to have a negative coefficient in the model.
FCF & CAPEX	Positive	Positive	Optimization of free cash flow and capital expenditures has a positive impact on value creation.
Operational partner/team	Positive	Negative	An operational partner/team where expected to have a positive impact, but is found to have a negative coefficient in the model.
Change in management (Prior year 1)	Positive	Negative	Replacing management during the first year is unexpected negative. A possible explanation is that companies run by incapable management are a more risky investment than a company with high-skilled managers who only need aligned incentives to run the company accordingly to the strategy of the private equity fund.

			Also the coefficient captures both changes decided at the time of the acquisition, which should have a positive impact as well of changes due to management not fulfilling the expectations of the fund, which will have a negative impact.
Change in management (Post year 1)	Negative	Negative	Change in management after the first year of ownership has a negative coefficient though close to zero and insignificant. A possible explanation is that the coefficient captures both changes as a result of incapable management as well as changes due to natural turnover such as retirement and other management specific changes in preferences, making change of management post year one insignificant in the model.
Inorganic changes	Positive	Redundant	Inorganic changes are redundant in the model.
Long-term content projects	Negative	Positive	The coefficient turned out to be positive indicating that cutting down on long-term content projects may have a positive effect on value creation.
Panel B			
Fund size	Positive	Positive	Fund size has a positive impact, meaning that a larger fund will have a higher return than a smaller fund.
Enterprise value	Ambiguous	Positive	Company size has a positive impact on value creation. Scale, level of competence, less dependent on persons, international markets and exit opportunities may make larger companies more robust to changes in demand and macro environment, decreasing the spread in returns among large companies. On the other hand smaller companies may be more volatile and have larger spreads in returns, not captured by the definition of the IRR intervals.

Relative importance	Negative	Negative	If only one of the drivers is responsible for value creation it will result in a lower return.
Still PE owned	Negative	Negative	Still PE owned is negative. Possible explanations are that the CEOs are conservative with regards to expected returns that expected returns are lower in the earlier stages of ownership or that the funds do not realize low return investments hoping to improve them.
Years of ownership	Ambiguous	Positive	A longer time horizon has a positive impact on value creation. In the trade-off between time and costs of capital, as time-value-of-money calls for a convex increase in value creation, the costs are out weighted by the larger upside in waiting for initiated projects to become profitable.

9.1 Governance

Alignment of interests through the design of compensation schemes, bonuses, warrants and other personal benefits mitigate agency costs and have a positive impact on value creation but there is a downside to the strong incentives if they come at a cost for *unincentivized tasks* such as commitment to clients, suppliers and employees supporting the arguments in favor of superior corporate governance under private equity ownership solving the principal-agency problems related to moral hazard and thereby lowering agency costs. *Active ownership* through interaction with fund managers, the board structure and frequency of board meeting should facilitate faster decision making resulting in a positive impact on value creation, but turned out to be negative against expectations. A possible explanation is that fund managers spent relatively more time on the worst performing companies within their portfolio compared to the best performing companies. In addition, there may be a psychological bias such that the CEOs feel responsible for initiatives which has worked well and put more of the responsibility on the funds when the results are not as good. Surveying general partners, Acharya et al (2009) find positive returns are related

to GP involvement and external support. In 92% of the cases the general partners have regular informal interactions with the CEO in the first 100 days at a weekly or daily frequency. [71]

The importance of active ownership should not be neglected as the majority of the CEOs indicate that active ownership is medium to highly important. One CEO stated:

> *"The key is the board of directors and it is important to distinguish between appointing friends of friends and being a sparring partner to the company."*

The quotation highlights that appointing a new board of directors is indeed a tool that can add value and improve the operations of the company if the board of directors are not appropriately chosen for the purpose or a result of nepotism.

9.2 Finance

Capital structure was expected to have a positive impact on value creation, but is found to have a negative impact. Firstly, there is a problem with regards to the phrasing of the question related to capital structure, as the question ask the CEOs to rate the importance of capital structure for value creation. Hence, it is possible to rate capital structure of high importance both when it has had a negative as well as a positive impact on value creation. Secondly, having a private equity fund as owner was thought to help the company gain access to capital either through better lending reputation with the banks or from the fund investing more money in the company if needed, with the underlying assumption that the optimal capital structure would increase the fraction of debt under private equity ownership. One CEO supports the argument by stating:

> *"One important step has been that the PE has "been there" during the financial crisis. Not that they actually has put in more equity during this last 5 years period, but the trust towards banks and customers, that they are there and have capital if needed, has been important."*

However, if the fund fails to optimize the capital structure resulting in too much leverage, it may limit the operations of the company resulting in a negative impact on value creation. The financial crisis may have increased the likelihood and the costs of financial distress and thereby

[71] Acharya et al (2009) page 33-35

lowered the optimal level of debt. A possible explanation is therefore, that the high leverage limits the operations of the company. Another CEO supports the argument by stating:

> *"The fund has had a negative influence on financial matters and has put extra pressure on available capital during the period. I would characterize the fund as a sleeping partner in many ways."*

Judging from the negative coefficient, an overweight of companies have experienced a negative impact of capital structure which may not have been optimal in the light of the financial crisis and the following slow-down in the economy. On the other hand optimization of *free cash flow and capital expenditures* has had a positive impact on value creation by increasing operational liquidity through networking capital and by putting an upper bound on capital expenditures forcing only the highest return investments to be initiated. An optimal capital structure should according to Jensen (1989) lower the costs of free cash flow available for spending at the discretion of the manager. Hence, a positive coefficient on free cash flow & capital expenditure is consistent with theory though not directly obtained from optimization of capital structure.

9.3 Operational

An *operational partner/team* supporting the company on a regular basis by bringing in industry knowledge or experiences from other portfolio companies is unexpected found to have a negative impact on value creation. A possible explanation is that fund managers spent relatively more time on low performance companies within their portfolio. However, the CEOs rate operational partner/team in general as none/low importance in table 3. Therefore, a psychological bias may exist as management will feel responsible for operational initiatives if they have worked well while they will be more tempted to feel that the initiatives were imposed by the fund if they were not as successful. One CEO stated:

> *"Being private equity owned gave access to a widespread and 'strong' international network."*

Hence, the question may not capture the effect of the fund as a network to experiences from other portfolio companies and industry experts if the CEOs interpret the question related to operational partner/team as it being the same person or team responsible for bringing in knowledge as

opposed to indirectly facilitating knowledge sharing. However, one caveat is the quotation marks around strong which could indicate that the CEO were not satisfied with the actual level of knowledge within the network.

Management change during the first year of ownership is negative and significant. Changing management during the first year of ownership was thought to be a way of adding operational capabilities to the company. The funds pay close attention to the management team before closing the deal, as management can be regarded as an asset when selecting the company and the fund will want to have the management team in place already before closing the deal and effectively this may imply that the actual decisions regarding change in management take place before acquiring the company. Changing the management during the first year of ownership may therefore show the combined effect of management changes decided at the acquisition stage in order to improve operational performance as well as management not fulfilling the fund's expectations and thereby having a negative impact on value creation.

Similar, changing management after one year may capture both the effect of replacing incapable management which should be negative, as well as management leaving for other reasons such as retirement or personal reasons which need not be negative. In sum, coefficients on changes in management were negative across specification though insignificant for changes after one year. Another possible explanation is that companies run by incapable management are in general riskier investments than companies with high-skilled management, who only need aligned incentives to run the company accordingly to the strategy of the private equity fund.

It is therefore ambiguous, what is the underlying cause of the negative coefficient on change in management, and it cannot be concluded that changing management in general has a negative impact on value creation as causality may run the other way such that low return-companies are a causing change in management and not management changes causing increased return. A CEO supports the hypothesis of bringing in skilled people as a way of adding capabilities.

> *"PE will often review the human resources in a company and make considerable changes in the team towards high-energy people, which are often over-sized compared with the task at hand, and represent deep experience relevant to the particular challenge facing each company."*

In sum, a detailed analysis of not only the CEOs but also the top-layer of management would be appropriate.

Long-term projects are unexpected positive and significant, meaning that letting long-term content projects (>5years) suffer has a positive impact on value creation. This is a bit controversial and among the critic points of private equity ownership. However, the impact may vary depending on the stage of the ownership, as one CEO state:

> *"When exit is approaching it may come at a cost for the long-term investments."*

The cost on long-term investments when exit approaches, are consistent with a positive coefficient on the costs of long-term projects in the model, though in contrast to the findings of Lerner, Sorensen and Stromberg. What the model cannot explain is whether it is unprofitable long-term projects which suffer or projects with a horizon outliving the intended holding period of the fund. The question related to long-term projects is therefore not properly defined and one should be careful when concluding on the impact of long-term content projects under private equity.

Inorganic changes, such as acquisitions gaining access to new markets, new knowledge, scale etc. or divestments of unprofitable divisions were thought to increase overall profitability of the company, but is redundant in the model and thereby not a proven driver of value creation. A possibility is that not all companies in the sample has completed inorganic changes, such that indicating that inorganic changes has no impact on value creation is a result of a situation where no inorganic changes has been initiated. If that is the case, the question will be inconsistent as it will not be possible to distinguish between companies without inorganic changes and companies which have evaluated their inorganic changes as insignificant for value creation. However, one CEO commented:

> *"Change of ownership makes it much easier to change strategic direction. We made a lot of acquisitions in the late 90'es which were not adding value to our business but it is extremely difficult for a board and a management to question such decisions and change them. The fact that we had a PE fund buy us also allowed us to question all the previous strategic choices we had made – and make the necessary changes."*

In conclusion, the private equity ownership has certainly contributed to operational improvements, which can be summarized by a quote from a CEO:

> *"One of the key characteristics of private equity is to develop a plan with a limited number of focus areas and subsequently pursue such plan with all available resources, and with limited regard for the short term financial impact of such plan. This sets PE apart from other ownership models and is often a powerful way of improving performance."*

9.4 Control variables

Fund size has a significant positive impact, meaning that a larger fund will have a higher return than a smaller fund. A possible explanation is that a larger fund has a larger investment team and thereby potentially a larger network, which may constitute a competitive advantage in the selection process of potential target companies. Also, a larger fund may have better track record as good results inducing investors to allocate more money to that fund. This may be an advantage in terms of credit facilities with banks, attracting high skilled employees etc.

Enterprise value is positive indicating that larger companies have higher return. In theory enterprise value should not be a driver of value creation as that would make all investors acquire large companies until the arbitrage in doing so was ruled out by increasing prices as a result of excess demand. A possibility is a selection bias such that CEOs of larger companies delivering low return are more reluctant in answering the questionnaire as the risk of a story in the newspapers about a well-known company being poorly run by a private equity firm would create more damage for the CEO, the company and the fund. Also, a larger spread in performance among smaller deals may not be captured by the intervals of IRR.

Deal type classified as growth, turn-around or stable cash flow deals, was expected to play a role in the model. Two reasons may explain why deal type is insignificant in the model. First, the classification process may include errors. Using the biq-data base allow for financial data from 2004, but due to the private nature of the companies, a substantial fraction of the companies do not disclose adequate financial information. Also, companies acquired in 2004 and 2005 will have little information about the company prior to the acquisition. Secondly, using the same argument as above, from a theoretical point of view deal type should not be a driver of value

creation as that would make all investors acquire a certain type until the arbitrage in doing so was ruled out by increasing prices as a result of excess demand.

Companies *still PE owned* show a negative coefficient in the model. It is important to include the parameter, as the distribution of IRR differs between realized and expected returns. Several factors may explain the negative coefficient. Firstly, CEOs of companies still under private equity ownership may be more conservative when reporting IRR as they do not know the exact level and thereby introduce a negative bias on companies which are still private equity held. Secondly, it may be that companies in their earlier stage of ownership have lower IRR consistent with the J-curve. Thirdly, it may indicate that low-return investments are less likely to be realized by the private equity fund.

The positive coefficient on *years of ownership* indicates that a longer time horizon has a positive impact on value creation. As mentioned previously, the time horizon is a trade-off between initiated projects becoming profitable and increased compound return from a longer time horizon. *Year dummies* for 2006 and 2007 show positive coefficients, indicating that acquisitions in those years are of relatively higher return than companies acquired in the base year 2004/2005. Companies acquired in 2004 or 2005 and still private equity held will have been under private equity ownership for 7-8 years, and a too long ownership horizon are indirectly lowered through the year dummies. Companies acquired in 2007 have the highest positive year dummy, and an ownership period of 5 years is therefore the value maximizing holding period in the sample.

Dummies for the relative importance (RI) of Governance, Finance, Operational and Multiple expansion taking the value 1 if the CEO has rated the importance higher than the 4^{th} quartile. The coefficients are all negative, indicating that using a combination of all value drivers gives a higher return. Including relative importance in the model is beneficial since the CEOs can rate that all drivers are highly important, but if only one driver is behind the value creation, this will bias the model. This is more likely to be the case when using dummies for low/high values of the categorical variables.

10. Measures not included in the model

The questionnaire included three questions not related to value creation, but which in the light of the critics related to the private equity industry are interesting. The questions include the impact of the financial crisis, the impact of incentives on risk taking and private equity ownership compared to the previous ownership structure.

The question related to the financial crisis asks the CEO how the financial crisis has affected the company compared to its peers. The idea is that the high leverage may have imposed a challenge in a difficult economic environment while the concentrated ownership and access to new financing may have constituted a competitive advantage. The financial crisis could have been a parameter in the model acting as a proxy for cyclicality in the industries the companies operate and thereby control for lower returns due to market conditions. However, the phrasing of the question makes the question unsuitable in the model as the CEOs are asked how the financial crisis has impacted the company relative to its peers. A company can perform better compared to its peers, but relatively worse compared to the other companies in the sample, e.g. if the company is more cyclical. A better way to make the model compensate for the impact of the financial crisis had been to take the cyclicality of the companies into account.

The CEOs are also asked whether the incentives give rise to increased or decreased risk taking under private equity ownership. Risk taking is not a characteristic of the private equity model but rather a product of the financial crisis inspired by excessive risk taking in the banking sector. Critics will say that CEOs of companies producing a low return will become less risk adverse when returns are low and they likely will lose their investments. The intuition is that CEOs of such companies will be willing to take any risks in order to regain their investments. On the contrary, CEOs of companies realizing a high return should become more risk adverse favoring decisions that reduce the risk of the firm's assets, wanting to 'play safe' and realize the monetary benefit of their compensation packages. Figure 6 below plot risk versus IRR.

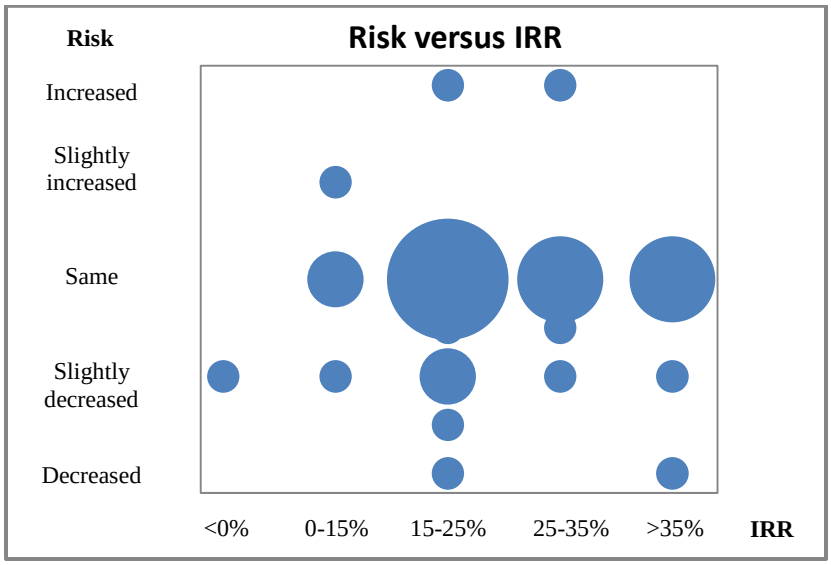

Figure 6: IRR-Risk plot

Evident from the plot of Risk versus IRR this is not the case. Also, the majority of CEOs indicate that risk taking is unchanged and only 3 CEOs states that the strong incentives give rise to increased risk taking and on the contrary 12 CEOs think it has decreased risk taking. Hence, there is no evidence, that increased risk taking is a part of the private equity model. The findings are consistent with high leverage can result in risk adverse managers favoring investment decisions that reduce the risk of company assets as a mean to avoid bankruptcy.[72]

Finally, the CEOs are asked to which extend the private equity ownership has generated value for the company which would not have been generated under the previous ownership structure. Hence, the question touches upon whether private equity generates alpha and if the ownership model is superior compared to other ownership structures. Since most companies experience a change in management, the majority of the respondents will not have worked for the previous owner making direct comparison impossible. Despite not having worked under the previous ownership structure they have prior work experience, and it will be fair to conclude that the 57% of the CEOs find that the private equity ownership support increased value creation under private equity ownership, 32% find the value creation unchanged and 10% find it decreases. One caveat is the adverse selection bias when private equity firms hire new management, they may attract CEOs of a certain type favoring the private equity model.

[72] Bergström et al (2007) p. 23

11. Robustness and potential biases

Due to the nature of the survey, the responses are subjective. Many of the questions leave room for psychological bias and interpretation issues. This is the main weakness of the model, and to increase the validity of the results in has been necessary to include the influence of potential biases as discussed below.

11.1 Technical issues

11.1.1 Sample size

The sample size is small with only 46 observations and poses a challenge for the statistical validity of the model. The maximum likelihood estimator will be consistent and asymptotically normal when the sample size approaches infinity. According to Long & Freese, the maximum likelihood estimator is not necessarily a bad estimator in small samples, but it is risky to use maximum likelihood for samples with less than 100 observations. In addition, the sample size should depend on the number of parameters, and with a model of 20 parameters the number of observations is scarce.

11.1.2 Missing data

The data set contains responses with missing data on IRR for 4 companies. It is assumed that the data is missing completely at random or based on the value of a regressor and the effect is to reduce sample size but not introduce bias.

For the respondents which have chosen not to answer the questionnaire, the missing data may be missing because of a selection process related to the value of the dependent variable and the selection process can introduce correlation between the error term and the independent variables, also called a sample selection bias. This may be the case if the probability that the CEO does not respond is higher for companies with low IRR.

11.1.3 Omitted variables

The problem of omitted variables bias arises if more factors should be included in order to explain IRR. The question related to operational partner may not capture the effect of the fund as a network and experiences from other portfolio companies and industry experts if the CEOs

interpret the question related to operational partner/team as it being the same person or team responsible for bringing in knowledge as opposed to indirectly facilitating knowledge sharing. The model could be improved by including measures of external support and level of expertise among the board of directors as explanatory variables.

11.1.4 Measurement error

Since the data is collected through a survey the respondents may give wrong answers, an example could be that the CEOs are not informed of the exact score of IRR. The impact of measurement error in the dependent variable will depend on the relation of the measurement error with the independent variables. It will be fair to assume that the measurement error in IRR is independent of each explanatory variable implying that the measurement error is uncorrelated with the regressors, and OLS and maximum likelihood estimation of the ordered probit model will consistently estimate the equation, though resulting in a larger error variance.

11.1.5 Simultaneous causality

When running a regression, we assume that causality runs from the independent variables to the dependent variable. However, if causality runs from the dependent variable to one or more regressors there is simultaneous causality causing correlation between the independent variables and the error term and an OLS regression will pick up both effects causing the estimator to be biased and inconsistent. Simultaneity poses therefore a threat to the model if IRR are determining for the explanatory variable. Say that low IRR drives more active ownership, rather than active ownership is responsible for a high IRR.

11.2 Comparing CEO responses

Responses from two CEOs are available for four of the companies. As a robustness check, their responses are compared in the table below, such that CEO1 has been CEO of the company in the first period of the ownership and CEO2 is the most recent CEO. The purpose of the exercise is to examine whether the CEOs agree on the responses, as disagreement among two CEOs of the same company could indicate that they misinterpret the question. Another possibility for disagreements could be that certain factors are more important in the early stage of the ownership

than in later stages. Finally some deviation is expected, as it may vary among the respondents how likely they are to use the scale. Responses are shown in table 10 below.

Table 10: Answers from CEOs of the same company

CEO	Years of ownership	Still PE-owned	Enterprise Value (DKK bn)	IRR	Active ownership	Incentives	Unincentivized tasks	Increased risk	Capital structure	FCF & CAPEX	Operational partner	Inorganic growth	Long-term projects	Financial crisis	PE vs. previous owner
Company1															
CEO1	2-3 years	No	0.1-1	15-25%	5	3	4	2	2	5	1	1	4	2	2
CEO2	4-5 years	No	NA	NA	5	5	2	1	5	4	3	2	3		4
Average	2-3 years	No	0.1-1	15-25%	5	**4**	**3**	1.5	**3.5**	4.5	**2**	1.5	3.5	.	**3**
Company2															
CEO1	6-7 years	Yes	1-5	>35%	5	4	4	1	5	5	2	4	4	3	4
CEO2	6-7 years	Yes	1-5	25-35%	4	4	4	4	5	4	1	4	2	2	3
Average	6-7 years	Yes	1-5	25-35%	4.5	4	4	**2.5**	5	4.5	1.5	4	**3**	2.5	3.5
Company3															
CEO1	6-7 years	Yes	0.1-1	15-25%	4	4	2	3	4	4	4	3	3	4	4
CEO2	6-7 years	Yes	0.1-1	15-25%	2	3	2	3	4	4	2	4	3	4	4
Average	6-7 years	Yes	0.1-1	15-25%	**3**	3.5	2	3	4	4	**3**	3.5	3	4	4
Company4															
CEO1	4-5 years	Yes	0-100	15-25%	4	4	2	2	3	3	1	4	2	3	4
CEO2	4-5 years	Yes	0-100	15-25%	2	3	2	3	4	4	1	2	2	2	2
Average	4-5 years	Yes	0-100	15-25%	**3**	3.5	2	2.5	3.5	3.5	1	**3**	2	2.5	**3**

Note: Responses deviating by two-points or more are bold

There are only one systematically difference in the responses of CEO1 and CEO2 – the answers related to active ownership. It appears that CEO1 rate the importance of active ownership higher than CEO2. An explanation could be that CEO1 have not performed well enough compared to the funds expectations and the fund has therefore been more active in the ownership, making CEO1 feel more pressure from the fund. CEO2 has potentially been running the company better than CEO1 and therefore feeling a lower involvement from the fund. This would support a negative coefficient on *active ownership* if the funds are more active in companies which do not perform well.

For the rest of the questions, there does not appear to be any systematic differences in the responses among CEO1 and CEO2 of the four companies. Only two disagreements are very troubling. In company 1, the two CEOs highly disagree on the question related to the importance

of capital structure, as one indicate it has low importance and the other indicate very high importance, supporting that there may be some problems related to the phrasing of that question. In company 2, the two CEOs have completely different opinions related to risk taking as one indicate decreased risk taking and the other indicate slightly increased risk taking.

12. Perspectives

The thesis takes a simple approach to value creation, isolating value creation at the deal level and not covering the distribution among stakeholders. From a social perspective value creation is somewhat different as it is necessary to distinguish between actual value creation and redistribution.

Improved corporate governance is a direct value driver in the sense that leading the company through active concentrated ownership offering optimal incentive contracts lowers the agency costs and increase productivity of the firm. Similar, operational value drivers facilitating more efficient use of the firm's resources and enhanced operational effectiveness through industry expertise should increase firm productivity and is a value driver from a social perspective.

On the contrary, financial improvements through high leverage lowering the costs of capital and enjoying tax deductibility on interest rates is rather a redistribution from debt holders and the public sector. The indirect effect on agency costs from optimization of free cash flow may have a positive impact on value creation from a social perspective, though the direct effect of optimizing the free cash flow to a large extend will come from better commercial contracts with suppliers and clients which also mainly is a matter of redistribution. Capital expenditure is not a trivial lever of value creation as the financial structure implies that the firms are only to initiate the best projects they may dismiss projects with positive net present value just slightly lower than the most profitable projects causing a loss from a social point of view. Finally, multiple expansion is neither a direct lever of value creation, but also a matter of redistribution.

The negative coefficients on the relative importance measures of the value drivers indicate that it is the combination of the value drivers which are important in value creation. In sum, the combined effects of the private equity model are beneficial from a social perspective if the redistribution does not cause negative externalities.

13. Conclusion

The objective of this thesis is to determine drivers of value creation under private equity ownership by gaining an understanding of the theoretical tools private equity firms have to create return on their investments and comparing them with an empirical examination among Chief Executive Officers (CEOs) in Danish private equity owned companies.

From a theoretical perspective, value creation in portfolio companies under private equity ownership can be attributed to three drivers; Governance-, Finance- and Operational engineering. In addition, returns may be driven by multiple expansion. Private equity funds can improve corporate governance by mitigating the principal-agent conflicts, through concentrated ownership, a more active board and better incentive schemes resulting in lower agency costs. In terms of finance, the private funds can optimize capital structure, as companies with other ownership structures often have a too low fraction of debt financing and since equity is relatively more expensive than debt financing. The optimal level of debt is a trade-off, as increased leverage on the one hand imposes costs of financial distress and bankruptcy, while on the other hand debt is relatively cheap compared to equity reinforced by tax deductions and puts a pressure on managers not to waste money reducing the agency costs of free cash flow available for spending at the discretion of managers. In addition, the funds can improve free cash flow generation and optimize capital expenditures. Operational value creation refers to industry and operating expertise, which may be brought in to the company directly from the general partners in the fund and consultants employed by the fund or indirectly through the board of directors or by hiring experienced and capable managers. Finally, returns from multiple expansion comes from market timing attributed to the fund managers.

Using a qualitative approach, value creation in Danish portfolio companies bought in the period 2004-2007 has been examined through surveying the Chief Executive Officers who has rated the relative importance of questions related to governance, finance and operational value drivers, using the internal rate of return (IRR) as a proxy for the value creation. Running multiple regression analysis estimated by OLS and Interval Regression in STATA, the qualitative variables were linked to IRR. In conclusion, Interval Regression turned out to be better suited for the data than OLS regression. Also, treating the categorical variables as interval rather than

ordinal is a too strong assumption, and rather using dummies for low versus high return and taking the relative importance of the value drivers into account improves the model.

Corporate governance under private equity ownership lowers the agency costs. The incentive packages offered solves the principal-agency problems related to moral hazard and thereby lowering agency costs, expressed by *alignment of interests* having a positive impact on value creation. However, there is a downside to the strong incentives if they come at a cost for *unincentivized tasks.* The high management turnover support enforcement of corporate governance, and though not directly measured, indirect incentives such as career concerns and reputation may also play an import role.

Active ownership and *operational partner* turned out to be negative against expectations, an explanation being that fund managers spent relatively more time on the low performing companies within their portfolio combined with a psychological bias as the CEOs feel responsible for operational initiatives if they have worked well and put more of the responsibility on the funds when the results are not as good. General partners spending relatively more time on companies, which are not performing, are also supported by CEOs, which has been replaced, rating active ownership of higher importance than their successors. The relative importance measures of the value drivers are not consistent with the ratings of the questions related to operational value drivers indicating that the questionnaire has an omitted variable bias. The question related to operational partner may not capture the effect of the fund as a network to best practice inspiration from other portfolio companies and industry experts.

Financial engineering in terms of designing optimal *capital structure* is found to have a negative impact on value creation, as the phrasing of the question makes it possible to rate capital structure of high importance both when it has had a negative as well as a positive impact on value creation. An overweight of companies in the sample have experienced a negative impact of capital structure, which may not have been optimal in the light of the financial crisis and the following slow-down in the economy. Consistent with theory, lowering the costs of free cash flow available for spending at the discretion of management through optimization of *free cash flow and capital expenditures* have a positive impact on value creation by increasing operational liquidity through networking capital and by putting an upper bound on capital expenditures forcing only the highest return investments to be initiated.

IRR sample mean of exited and still private equity owned companies are almost identical, though the distribution, making the variation in IRR as well as controlling for whether the company is still private equity held important. Companies which are *still PE owned* have a longer holding period of 5.5 years compared to exited companies having an average holding period close to 4 years and show a negative coefficient in the model. The negative impact is a result of conservatism when reporting IRR, companies in their earlier stage of ownership have lower IRR and low-return investments are less likely to be realized by the private equity fund. A holding period of 5 years is found to maximize value as *years of ownership* has a positive influence on value creation up until this point.

Fund size has a significant positive impact, meaning that a larger fund will have a higher return than a smaller fund. Sophisticated investors in private equity will imply that they will allocate money to the best performing funds making them grow and a positive impact of fund size is therefore consistent with fund performance being persistent. The limitation of this conclusion is new funds with short track-records, which cannot indicate future performance. In addition, the results may be biased of the financial crisis as smaller funds will invest in smaller companies. Evident from the positive coefficient on *enterprise value,* indicating that larger companies have higher return, a selection bias among large companies or a larger spread in performance among small deals not captured by the intervals of IRR may distort the results.

Change of management (prior year 1) and *change of management (post year 1)* are both negative, but it cannot be concluded that changing management in general has a negative impact on value creation. Changing the management during the first year of ownership show the combined effect of management changes decided at the acquisition stage in order to improve operational performance as well as management not fulfilling the fund's expectations. Changing management after one year captures both the effect of replacing incapable management, as well as management leaving for other reasons such as retirement. A more detailed analysis of not only the CEOs but also the top-layer of management would be appropriate.

Long-term projects are positive implying that sacrificing long-term content projects has a positive impact on the returns, but the model cannot explain whether it is unprofitable long-term projects that suffer or projects with a horizon outliving the intended holding period of the fund. The question is not properly defined and more detailed analyses of the projects which suffer

under private equity ownership is needed for final conclusions on the impact of long-term content projects for value creation.

Inorganic changes are redundant in the model but if not all companies in the sample has completed inorganic changes the question will be inconsistent, as it will not be possible to distinguish between companies without inorganic changes and companies which have evaluated their inorganic changes as insignificant for value creation.

The negative coefficients on the relative importance measures of the value drivers indicate that it is the combination of the value drivers which are important in value creation and the combined effects of the private equity model are beneficial from a social perspective if direct value creation up weights potentially negative externalities of redistribution.

In addition, to the theoretical drivers of value creation, the analyses show no evidence that increased risk taking is a part of the private equity model. Further, the majority of CEOs experiences that value creation under private equity is superior to other ownership structures.

Ideally the analysis could have controlled for skill-level among the board of directors, business cyclicality in the industries in which the portfolio companies operates, the use of external advisory as well as top-management changes, but this is left for future research.

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Appendix 1 - CEO Questionnaire

Please indicate by X

About the transaction

1. For how long has the company been owned by a Private Equity fund?

0-1 year	2-3 years	4-5 years	6-7 years	>7 years

2. Is the company still owned by the Private Equity fund?

Yes	No

3. What was the value/transaction price of the company at the time the Private Equity fund acquired the company?

0-100 mio. DKK	0,1-1 mia. DKK	1-5 mia. DKK	5-10 mia. DKK	>10 mia. DKK

4. What is/was the expected Internal Rate of Return (IRR) of the investment to the Private Equity fund?

<0%	0-15%	15-25%	25-35%	>35%

Governance

5. Rate the impact of concentrated active ownership of your company (e.g. the interaction with the fund managers, the board structure, the frequency of board meetings) for value creation while under Private Equity ownership:

None	Low	Medium	High	Very high

6. Rate the impact of alignment of interest for value creation while your company were/is under Private Equity ownership (e.g. the compensation, bonuses, warrants or other personal benefits):

None	Low	Medium	High	Very high

7. To which extend, if any, does the strong incentives for reaching certain objectives come at a cost for other tasks, core to the business of your company, that due to lack of measurability was not included in the compensation linked objectives? (E.g. commitment to clients, suppliers, employees etc.)

None	Low	Medium	Large	Very large

8. In your opinion, does the compensation scheme offered at your company while under Private Equity ownership give incentive to decreased or increased risk taking?

Decreased	Slightly decreased	Same	Slightly increased	Increased

Finance

9. Rate the impact of capital structure (debt-equity ratios, access to capital) for value creation in your company while under Private Equity ownership:

None	Low	Medium	High	Very high

10. Rate the impact of free cash flow and capital expenditure optimization for value creation under Private Equity ownership:

None	Low	Medium	High	Very high

Operational

11. To which extend do the fund have an operational partner/team that bring in operational capabilities supporting the company on regular basis? (E.g. industry knowledge, experiences from other portfolio companies):

None	Low	Medium	High	Very high

12. How large a part of the value creation is obtained through inorganic changes of the company such as divestments or acquisitions:

None	Low	Neutral	High	Very high

13. To which extend has long-term content projects (>5 years) like R&D suffered under Private Equity ownership:

None	Small	Some	Large	Very Large

14. How has the impact of the financial crisis affected the Private Equity owned company compared to its peers? (E.g. do the high leverage impose a challenge in a difficult economic environment or has the concentrated ownership and access to new financing constituted a competitive advantage?)

Much worse	Worse	Similar	Better	Much better

Overall assessment

15. To which extend have the Private Equity ownership generated value for the company, which would not have been generated under the previous ownership structure?

Much lower	Lower	Same	Higher	Much higher

16. In your opinion, which of the following four areas has been the most important driver of value? **(Please indicate relative importance by dividing 100% among the four drivers.)**
    - Governance (E.g. concentrated ownership, more active board, better incentive schemes)
    - Finance (E.g. improvement of free cash flow, optimization of capital expenditures, higher leverage, access to capital)
    - Operational (E.g. the fund as a sparring partner, long-term perspective and time-out from quarterly reporting, growth initiatives, improvement of efficiency)
    - Multiple expansion (E.g. market timing and negotiation skills attributed to fund managers)

A	B	C	D
%	%	%	%

17. Please comment, if any main drivers of the company's results during Private Equity ownership has not been mentioned above:

Appendix 2 – Confidentiality Agreement

This Confidentiality Agreement (this **"Agreement"**) is on the below mentioned date entered between

1) [CEO name] (the **"Manager"**)
2) NINNI THORKILGAARD (the **"Recipient"**)

The Manager and the Recipient are hereinafter referred to as a **"Party"** and jointly as the **"Parties"**.

WHEREAS:

A) The Recipient will write a Thesis as part of her studies at Copenhagen Business School (The **"Thesis"**). The Thesis will focus on Operational Value Creation under private equity ownership. After completion, the Thesis may be used for a Scientific Article for a financial newspaper/magazine (the "Article").
B) The Recipient wishes to be provided with certain confidential information from the Manager, regarding his experience of managing a company under private equity ownership, necessary to make the analysis for the Thesis.
C) The Manager agrees to provide the Recipient with such confidential information in accordance with the terms and conditions of this Agreement.

IT IS AGREED as follow:

1. Definition of Confidential Information

In this Agreement "Confidential Information" means any and all information whether written, oral or in any other form, which is obtained by the Recipient from the Manager save for disclosure (other than by breach of this Agreement).
The fact that the Manager is providing information and the existence and contents of this Agreement shall also be Confidential Information.

2. Use of Confidential Information

2.1 The Recipient agrees and acknowledges that the Confidential Information may solely be used for academic purposes. Hence, of making the analysis necessary for the Thesis and potentially a Scientific Article and not for any other purposes and undertakes toward the Manager, the Company or the Fund to treat the Confidential Information in accordance with this Agreement. The Thesis and Article may only include or reflect the aggregate result of any Confidential Information provided by the Manager and citation may be used without the Manager's written approval.

2.2 The Recipient acknowledge that none of the Confidential Information is its property. The disclosure to the Recipient of any Confidential Information shall not give the Recipient any license or other rights whatsoever in respect of any part of such Confidential Information beyond the limited rights contained in this Agreement.

3. Disclosure Restrictions

3.1 Save as provided in Section 3.2 below, the Confidential Information will be held in complete and strict confidence by the Recipients. No Confidential Information may be copied or reproduced in any way without the prior written consent by the Manager unless required for the Thesis or for the Article.

3.2 Section 3.1 above does not apply to the extend that the Recipient is required to make a disclosure of Confidential Information by law or pursuant to any order of court or other competent authority or tribunal. In the event that the Recipient would be required to make such disclosure the Recipient shall only make a disclosure to the extent to which it is obliged but not further otherwise. The Recipient agrees to give the Manager immediate notice prior any such disclosure. The Recipient confirms that it is not now under any obligation, and that it shall not voluntarily assume any obligation, which would or might require the Recipient to disclose any Confidential Information.

4. No Warranty

The Manager nor the Company make any representation or warrenty, expressed or implied, as to the accuracy, reliability or completeness of any of the Confidential Information and neither the Manager, the Company nor the Fund will have any liability whatsoever to the Recipient or any other party resulting from the use of the Confidential Information.

5. Term

This Agreement shall remain in force without limitation in time from the date hereof.

6. Remedies

6.1 The Recipient shall be separately liable towards the Manager for any breach of this agreement.

6.2 The Parties acknowledge and agree that damages only may not be an adequate remedy for any breach of this undertaking by any Party and that accordingly the Parties entitled to the benefit of this undertaking shall be entitled (but not limited) to seek specific performance or injunctive relief.

7. Invalid Provisions, Amendments and Governing Law and Jurisdiction

7.1 If any court or administrative body of competent jurisdiction finds any provision of this Agreement to be invalid, unenforceable or illegal, the other provision of this Agreement shall remain in force. If any invalid, unenforceable or illegal provision would be valid, enforceable or legal if some part of it were deleted or modified, the provision shall apply with whatever modification is necessary to make it valid, enforceable and legal.

7.2 A variation of this Agreement shall be in writing and signed by or on behalf of both Parties. A waiver of any right under this Agreement is only effective if it is in writing and it applies only to

the person to whom the waiver is adressed and the circumstances for which it is given. No failure to exercise or delay in exercising any right or remedy provided under this Agreement or by law constitutes a waiver of such right or remedy or shall prevent any future exercise in whole or in part thereof.

7.3 This Agreement shall be governed by and construed in accordance with the laws of Denmark without regard to its principles of conflict of laws.

7.4 With the exception of the right to seek specific performance or injunctive relief as set out in Section 6.2 above, any dispute controversy or claim arising out of or in connection with this Agreement, or the breach, termination or invalidity thereof, shall be finally settled by arbitration in accordance with the Rules of the Danish Institute of Arbitration.

7.5 The place of arbitration shall be Copenhagen, Denmark. The language to be used in the proceedings shall be English.

7.6 The Parties undertake and agree that all arbitral proceedings conducted with reference to this arbitration clause will be kept strictly confidential. This confidentiality undertaking shall cover all information disclosed in the course of such arbitral proceedings, as well as any decisions or award that is made or declared during the proceedings. Information covered by this confidentiality undertaking may not, in any form, be disclosed to a third party without the prior written consent by the other Party. The confidentiality undertaking following from this Section 7.6 shall apply without any limitation in time.

_____

Place:

Date:

Printed name: _____ Signature: _____

Printed name: _____ Signature: _____