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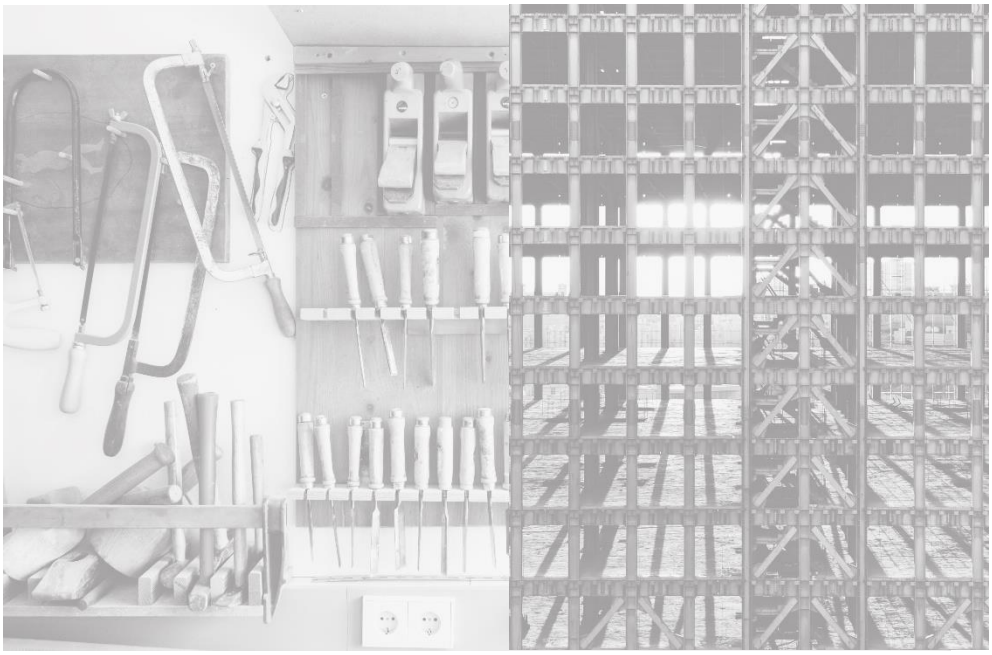
Applying the toolbox or battling inherent predispositions?

A study of how select pre- and post-transaction governance/ownership factors impact post-transaction operational performance changes in private equity portfolio companies.



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Abstract

Private equity has seen an increased amount of attention in financial literature in recent years. Levels of activity in the industry have seen notable increases. Alongside these developments in activity, the face of private equity and the ways in which private equity companies interact with their portfolio companies has seen new developments. No longer do private equity companies merely rely on operational and financial engineering to create value. Private equity companies have taken on a new role as active owners, realizing the importance of governance and parenting.

This thesis follows in the footsteps of previous studies in trying to ascertain what drives the heterogeneous post-transaction operational performance changes of private equity portfolio companies. In doing so, this thesis sets out to explore the impact of pre- and post-transaction governance/ownership factors, such as prior family ownership and board involvement, on post-transaction operational performance changes in portfolio companies. Thus, the thesis considers both concrete applications of private equity's value creation levers, as well as inherent predispositions characterizing the acquired portfolio company and the acquiring private equity company. Based on a thorough literature review, a conceptual model is derived explaining how these factors are hypothesized to impact post-transaction performance changes.

The conceptual model is tested in an empirical setting using regression analysis and a hand-collected sample of 83 Danish transactions from the post-financial crisis era. The empirical analysis reveals evidence that portfolio companies acquired by domestic private equity companies see superior operating performance changes. Statistical evidence is also found for the notion that active governance, as proxied by high levels of board involvement, leads to superior performances changes. Weak statistical evidence, slightly outside accepted and conventional significance levels, is found for the notion that family companies see inferior performance changes, albeit contingent on no post-transaction CEO change taking place in these companies. Previous authors have found statistically significant relationships between performance changes and e.g. prior private equity ownership, CEO changes, and ownership by industry focused private equity companies. The analysis at hand does not corroborate these findings.

Based on past literature, the conceptual model, and the empirical findings, it is argued that private equity companies should consider the geographic reach of their investments and how they interact with portfolio companies. Further research is recommended within the realm of family companies as private equity investments and on how private equity companies engage in active ownership.

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1. Introduction

The realm of private equity is a place filled with opaqueness and secrecy. Ever since the first corporate raiders of the 1980s, the asset class has experienced a reputation linked with die-hard capitalism and the cold-blooded pursuit of profit. Yet, the face of private equity is changing. Over the last decades, a new breed of private equity has emerged, and the classic tactics of slicing and dicing acquired companies to generate the highest return is no longer the go-to strategy for private equity companies. Rather, a hands-on, interventionist approach is increasingly being taken by the majority of private equity companies who do not simply want to harness value through financial arbitrage, but also see their role as company overseers, generating value through active ownership. The focus of private equity toolbox, in other words, has developed from being one merely defined by arbitrage and financial levers, to one in which levers such as governance and strategic intervention are more salient.

This change in the approach of private equity has coincided with an increasing focus on what explains the heterogeneity in the operational performance of private equity portfolio companies. While the matter of private equity portfolio companies' performance relative to their non-private equity owned peers is no doubt still salient, an increasing amount of research has been dedicated to explaining the performance differences amongst portfolio companies. A particular focus, given the changing face of private equity, has been on the manner by which private equity companies engage with their portfolio company through formal governance mechanisms. Yet a number of authors have also focused on factors relating to the acquiring private equity companies and the acquired portfolio companies, hypothesizing that certain underlying factors may impact the ability of private equity companies to pursue the aforementioned interventionist approach.

This thesis follows in the footsteps of the aforementioned trend. It seeks to explore how a select number of pre-transaction factors relating to ownership and acquirer characteristics, as well as specific post-transaction actions within the realm of governance, impact operational performance changes in private equity portfolio companies. The thesis thus considers both concrete applications of the private equity toolbox, as well as inherent predispositions characterizing the acquired portfolio company and the acquiring private equity company. In studying these factors[1], the thesis not only focuses on factors that have been analyzed at varying lengths by previous authors, such as the role of foreign/industry focused ownership, prior private equity involvement, as well as changes in governance and management, but adds

[1] The factors will be referred to as ownership/governance factors throughout the thesis for the sake of brevity.

to existing literature by delving into uncharted territory and exploring the role of prior family involvement.

With private equity having become a global phenomenon, it is no wonder why previous authors have focused increasingly on specific geographies in their studies. This thesis seeks to explore the role of the aforementioned ownership/governance factors in a Danish context. The Scandinavian private equity market is interesting in the sense that the amount of private equity investment per capita exceeds a number of otherwise large private equity markets, such as Germany (Frontier Economics, 2013). Despite this, relatively little research has been conducted on the Scandinavian private equity market, and even less has been dedicated to the Danish market. With an increasing number of private equity transactions in Denmark, and a population that is increasingly becoming aware of the asset class, it appears justified to conduct a study of the impact of ownership/governance factors in a Danish context. Further to this specific focus on the Danish realm of private equity, it appears that private equity has seen a recent resurgence since the financial crisis. The number of deals and money invested in private equity has grown consistently since 2010 and the end of the financial crisis (Bain & Company, 2018), which marked the end of what some have referred to as the second private equity wave (Klier, Welge, & Harrigan, 2009). Hence, given said trend, this thesis seeks to explore the ownership/governance factors in a post-financial crisis context.

1.1. Research question and thesis structure

With the motivation outlined in the introduction above, the following overall research question is posed:

How do select pre- and post-transaction factors relating to ownership/governance impact post-transaction operational performance changes in private equity portfolio companies?

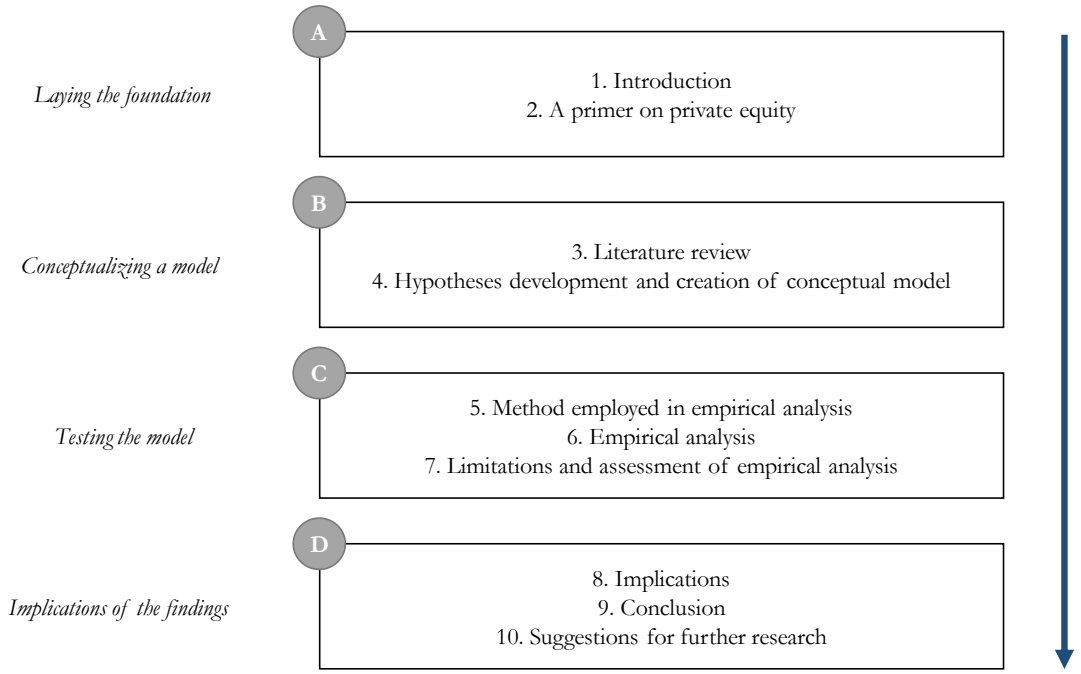
To guide the exploration of this question, a set of sub-research questions has been created. These serve not only to ensure that the research question is answered in a holistic manner, but also to ensure comparability with previous studies on the topic:

A. What is private equity, how have levels of activity in the asset class developed over time, and how do private equity companies interact with their portfolio companies?
B. How has the face of private equity changed, and what evidence has previous literature found in regard to the impact of select ownership/governance factors on operational performance in private equity portfolio companies?
C. What, if any, governance/ownership factors impact post-transaction changes in the operational performance of Danish private equity portfolio companies?

D. How can private equity companies and their investors use insights related to the ownership/governance factors of interest to better their respective performance?

The structure of the thesis is visualized in Figure 1 below. The visualization presents the individual Sections of the thesis in accordance with the way that they help answer the abovementioned sub-research questions, as noted by the letters highlighted in bold:

Figure 1: Thesis structure



Source: Own creation

1.2. Target Audience

The findings relating to research on the methods of private equity companies are of use to a multitude of stakeholders within the private equity industry, including government, employees of portfolio companies, etc. As alluded to, this specific thesis sets out to explore various ownership/governance factors and their impact on the operational performance changes in private equity portfolio companies.

Given that some governance factors, e.g. the composition of a portfolio company's board, are the decision of a private equity company, it is clear the private equity companies represent an important audience for the thesis. The findings relating to the actions which private equity companies can take, and their impact on the operational performance of their investments, can be used to modify and influence investment strategy and active engagement.

However, the factors that will be explored will not solely relate to decisions that private equity companies can make after acquiring a given portfolio company, but also factors that relate to the prior ownership of the given portfolio company and the acquirer itself. In regards to the latter, a second important audience is represented by the investors who invest in private equity funds, i.e. institutional investors in the form of pension schemes, etc. The latter will be able to use the findings from the thesis so as to guide their engagement with various private equity companies and their methodology in assessing which funds to invest in or not. Likewise, private equity companies may be able to use the findings to hone their investment processes.

In essence, the target audience of this thesis is two-fold. On the one hand, one has the acquiring private equity companies. On the other, but not less important, hand, one has the institutional investors investing in private equity funds.

1.3. Delimitations

As with any study, this thesis is subject to a number of delimitations. This study consists of an explanation of how private equity companies operate, a detailed literature review, as well as an empirical test of prior findings in a Danish, post-financial crisis era context.

In regards to the explanation of how private equity companies operate, the thesis limits itself to describing private equity companies that engage with investments in mature companies, i.e. disregarding venture capital investments.

In relation to the review of past literature, it should be noted that the realm of hypothetical ownership/governance factors that could be reviewed is abundant. This thesis considers a number of specific factors in detail that have been analyzed at length by previous authors, but also considers a number of under-researched factors that, as shall be discussed, are salient given current trends in private equity. The selected ownership/governance factors are as follows:

- Specific post-transaction governance factors
    - The role of involvement by acquirers in portfolio company boards
    - The role of active governance as proxied by changes in management in portfolio companies
- Specific acquirer factors
    - The role of domestic private equity ownership
    - The role of industry focused private equity ownership
- Specific pre-transaction portfolio company ownership factors

- The role of prior private equity involvement
- The role of prior family involvement

The author is well aware that further factors could be considered, but given space, data, and time constraints, the focus on a select group of factors was deemed fitting.

The other delimitations that have been made apply primarily to the empirical analysis. While all attempts have been made to limit the number of delimitations in the empirical analysis, certain data constraints, and methodological considerations unfortunately necessitate a handful.

Given that private equity portfolio companies represent investments for a given private equity fund, an obvious measure in studying them would be investment returns. However, data related to investment returns is not widely available. Hence, this thesis follows in the footsteps of the majority of research on private equity portfolio companies and focuses on changes in operational performance. The focus on such changes is not solely due to data constraints, but also the notion that investment returns from a given portfolio company are inevitably linked with the operational performance of said company.

As will be explored in subsequent Sections, private equity has experienced a number of 'waves' characterized by differing strategies and characteristics. The most recent wave can be deduced to have started following the financial crisis. As such, and per the motivation given the introduction, this thesis considers Danish private equity portfolio companies acquired in transactions having taken place in the time period 2010-2016. The lower bound coincides with the start of the most recent private equity wave. The upper limit is set in accordance with the event period studied, i.e. the period through which operational performance changes are analyzed. Specifically, this thesis will focus on changes from the year prior to the acquisition of a portfolio company till two years after. The choice of this event period will be warranted in following Sections. The reliance on the year prior to the transaction as a starting point is broadly applied in similar literature and helps removes potential distortions related to the transaction and the time of acquisition. As of this thesis' writing, only financials for financial year 2018 were widely available, thus necessitating the upper limit of 2016. This time frame obviously limits the broad ranging inferences that can be made on behalf of the empirical analysis.

Given the geography of focus, i.e. Denmark, and the event period in focus, it has been necessary to exclude transactions from the sample that did not have standalone Danish financials prior to the given transaction and throughout the event period. Likewise, in line with previous authors, the requirement of standalone financials has necessitated the exclusion of certain types of transactions with so-called 'atypical characteristics', such as fusions and add-on investments, for the sake of comparability and data integrity

(Guo, Hotchkiss, & Song, 2011). Furthermore, the analysis does not consider transactions relating to minority stakes, given the notion that active ownership cannot truly be enforced in such situations. Finally, it has been necessary to disregard a small number of transactions that did not provide sufficient or conclusive data in relation to the variables of interest. The restrictions on the transactions considered in the empirical analysis may have resulted in some selection bias in regard to the sample at hand. However, the author has valued accuracy in the analysis and deems the distortion from such potential selection bias as negligible.

As implied in the need for standalone financials, the thesis uses operating company financials in line with the vast majority of studies on private equity. This allows for the collection of financial data from a single entity, given that the operating company continues to exist following a transaction (Vinten, 2008). Inevitably, private equity ownership may entail changes in financial structure and reporting. However, attempting to adjust for such changes would require intimate knowledge outside the scope of master's program for which this thesis is written. Likewise, the focus of this thesis is on the operating performance in the specific portfolio company. Hence, factors relating to debt used to finance an acquisition, which is typically placed in a holding structure, are not relevant to consider given that they stem from the given private equity company's financing decisions and are outside the scope of operational performance.

Finally, it is important to note the general limitations of empirical analyses using statistical methods. While all attempts have been made to include all relevant considerations, e.g. in the form of control variables, endogenous factors may impact the interpretation of results from the empirical analysis.

1.4. Philosophy of science and research methodology

Before delving into the subsequent Sections of this thesis, it is imperative to clearly lay out the philosophy of science and research methodology employed throughout. Guba (1990) identifies four so-called inquiry paradigms characterizing research, namely positivism, post-positivism, critical theory, and constructivism. While a detailed description of each of these paradigms would be superfluous given the scope of the thesis, it is fitting to characterize the two paradigms that have influenced the inquiry at hand, namely positivism and post-positivism.

Both positivism and post-positivism acknowledge in their ontological stance that 'reality' exists and can thereby be observed from a third party viewpoint. While positivism takes that stance that such realities are absolute, post-positivism's ontological stance argues that while realities are absolute, they can never be fully apprehended by research inquisitions (Guba, 1990). This thesis' ontological stance straddles the border between the two paradigms. This is grounded in the sense that the effect of

ownership/governance factors on operational performance in private equity portfolio companies is understood to be something that something that can be seen as absolute, but the reality at play may not be fully understood.

While positivism and post-positivism do differ in regard to their perceptions of reality, their epistemological beliefs are more similar. Positivism's epistemology is characterized by the ideals that a researcher should view themselves as a third party, observing reality from a distance. Post-positivism acknowledges this but further argues that imbalances and distortions may occur in this attempt to be fully exogenous from a given piece of research (Guba, 1990). Again, the philosophy of the inquisition at hand straddles this boarder, albeit with a strong emphasis on positivism's belief that it is possible to study a given phenomenon from an objective viewpoint.

Post-positivism departs from positivism's reliance on purely scientific and deductive methodology in regards to conducting research. Instead, the paradigm notes the relevance of doing inquisitions in a "natural" setting (Guba, 1990). In regards to this facet of the two paradigms, the thesis at hand clearly takes the stance of positivism. The way by which research is conducted in this thesis is inspired by the approach in which questions or hypotheses that are "[…] *stated in advance in propositional form* [are] *subjected to empirical tests (falsification)* […]." (Guba, 1990, p. 20). Hence, the methodology employed in the thesis is characterized by a deductive approach in which a review of existing literature and findings is conducted so as to develop a number of hypotheses and a conceptual model, which is then tested in an empirical setting. The author recognizes that the way in which the hypotheses could be tested is plentiful and that the selected approach is but one, yet the reasoning for the choice of the empirical test at hand has been a result of data considerations and scope constraints.

2. A primer on private equity

Having ascertained the focus of this thesis, the delimitations made, and the underlying scientific philosophy characterizing the inquisition, it is salient to introduce private equity as an asset class, the development in activity levels within the asset class, and the general workings of the business model.

2.1. Defining private equity as an asset class

Private equity is a highly heterogeneous asset class that has been given a multitude of definitions over the years and in different literature. While the semantics of these definitions are varied, the core principle seems to be the same. As posited by Cendrowski, Petro, Martin, and Wadecki (2012, p. 4), private equity is an "[…] *equity investment that is not publicly traded on an exchange*." This broad definition thus means that private equity encompasses equity investments into privately-held companies, equity investments into

hedge funds that are not publicly-traded but invest in publicly-traded companies, equity investments into infrastructure projects, etc.

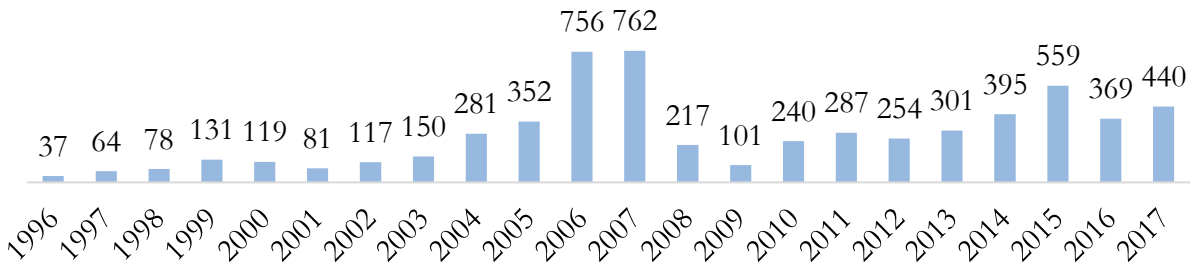
The aforementioned definition thus seems unwieldly vague. Therefore, it comes as no surprise that most literature on private equity has dealt with the equity investments in private companies or public companies that have been taken private following the given equity investment. Within this subset of private equity, one can consider investments into small, start-up companies and investments into more mature, established companies. The former is typically known as 'venture capital', where the latter is what is typically considered actual private equity. For the sake of semantics, private equity in this thesis is the provision of capital to established companies via e.g. various forms of leveraged buyouts (e.g. management buyouts/buy-ins, public-to-private transactions, etc.) (Cumming, 2012). Naturally, such investments are highly illiquid as opposed to other types of investments in e.g. publicly-traded securities. Hence, private equity is typically seen as more risky than an investment in a publicly-traded equity and is thus typically reserved for institutional and professional investors. (Cendrowski et al., 2012; Cumming, 2012)

Spliid (2014) notes that private equity transactions involve three key ingredients. The first is the requirement that the transaction relates to a private investment. The second relates to the fact that an investment is financed with a notable amount of debt. Hence, private equity funds acquire portfolio companies with some amount of equity, but a notable amount of the purchase price is funded by external debt. Finally, a private equity investment is time limited. Hence, private equity funds do not hold investments for an indefinite period, but rather, divest the given investment after a given time period. This period is different from investment to investment, and from fund to fund, yet most investments are held for a period between three to seven years (Bennedsen, Thomsen, Nielsen, Bundgaard, Nielsen, & Poulsen, 2008).

2.2. Private equity activity in a historical context

According to Spliid (2014), one can trace the roots of the form of private equity considered in this thesis to the mid-1970s in the U.S. A surge of activity took place in the 1980s, during which the industry saw notable cases such as KKR's acquisition of RJR Nabisco. This surge in activity has been attributed to the rise of the so-called junk-bond market in the U.S., which allowed private equity funds to raise large amounts of debt to finance acquisitions. However, with the subsequent crash in the junk-bond market, private equity activity fell (Kaplan & Strömberg, 2009). The industry has seen subsequent booms and declines, partly in response to e.g. economic cycles, a seen in Figure 2.

Figure 2: Value of global private equity transactions per year (in $1,000b)

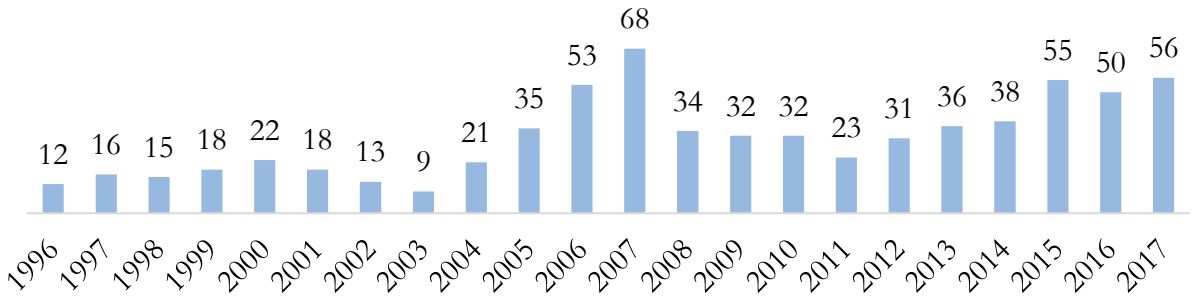


Source: Bain & Company (2018)

As per Figure 2, one can see that the most recent boom in private equity investment has been observed following the global finance crisis that took place between 2008 and 2010. It is the transactions that have taken place in this post-crisis period that are the focus of the thesis at hand.

The private equity industry in Denmark saw its first noticeable activity in the late 1980s and has since seen a noticeable increase in both amount of transactions but also the value of said transactions (Bennedsen et al., 2008; Spliid, 2014). The cycles seen in the Danish private equity industry appear to mirror the cycles seen in the global private equity market, as can be deduced from Figure 3. As of this thesis' writing, a notable amount of Danish private equity companies exist, including Axcel, Blue Equity, BwB Partners, Capidea, CataCap, Erhvervsinvest, Gro Capital, Maj Invest, Polaris, Via Equity, among others.

Figure 3: Danish private equity transactions per year

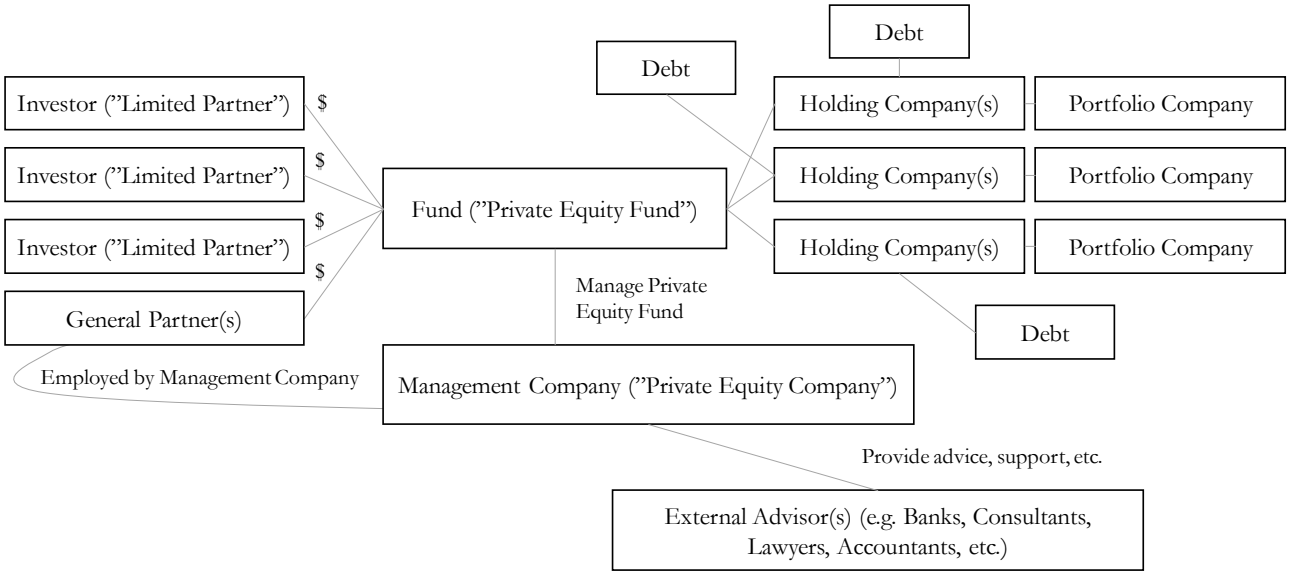


Source: Danish Venture Capital and Private Equity Association (n.d.)

2.3. The mechanics of the private equity model

While the activity in the private equity industry has ebbed and flowed over time, the mechanics of the business model have remained relatively stable. A graphical depiction of the mechanics of the private equity model is seen in Figure 4 below:

Figure 4: The mechanics of private equity



Source: Own creation inspired by Bennedsen et al. (2008, p. 11)

Private equity funds are organized as limited partnerships or limited liability companies. They are typically unregistered and not publicly traded (Cendrowski et al., 2012). In the classic limited partnership model, two types of partners exist, namely general partners and limited partners. Limited partners represent the investors in a given private equity fund. These investors typically include large institutional investors such as pension companies, high net worth individuals, family offices, or even so-called fund-of-funds. Fund-of-funds are themselves private equity funds that raise capital to invest in other private equity funds, rather than investing in portfolio companies directly (Bennedsen et al., 2008; Cendrowski et al., 2012). General partners, on the other hand, represent the management of the given private equity fund and the management company appointed by the fund to manage investments made by the fund. Throughout this thesis, the management company will be referred to as a private equity company, and the funds managed by it will be referred to as private equity funds. (Bennedsen et al., 2008; Cendrowski et al., 2012).

Private equity funds have a set lifetime - typically around 8-12 years. Throughout this lifetime, the fund goes through a range of activities. The initial steps of the fund are related to fundraising capital from limited partners. Once the fund has been 'closed' to investment, the fund goes through a period in which it invests the capital committed to the fund in specific portfolio companies. Subsequently, the fund goes into a phase in which the private equity company attempts to manage the investments so as to increase their value. This is followed by a phase in which the private equity company attempts to sell its portfolio companies and thereby increase the value of the given fund. (Bennedsen et al., 2008).

As previously mentioned, private equity transactions involve financing an acquisition with a certain degree of debt. Private equity funds seek to repay the debt involved in a given transaction with the operating cash flows from the relevant portfolio companies. This allows, all else equal, the value of the fund's equity in the given company to increase (Bennedsen et al., 2008; Cendrowski et al., 2012). The debt raised to purchase a given portfolio company is typically located in a holding company that is created to serve as a purchasing vehicle in the given transaction (Bennedsen et al., 2008). While most cash generated throughout the holding period is used to pay back debt, some profit may be distributed to investors in the form of dividends. Nevertheless, the main source of repayment to investors comes at the time of divesting the given portfolio company. When a portfolio company is sold, any capital left over, in excess of that needed to pay back remaining debt, is distributed to investors. Hence, returns to investors are paid out over the lifetime of the fund. Similarly, it should be noted that capital needed for the individual acquisitions is requested by the given private equity company at the time of purchase in accordance with amount needed. In other words, capital committed to a given private equity fund is not placed in an 'account' at the start of the fund's lifetime, but drawn down over time in accordance with funding needs. (Bennedsen et al., 2008; Cendrowski et al., 2012)

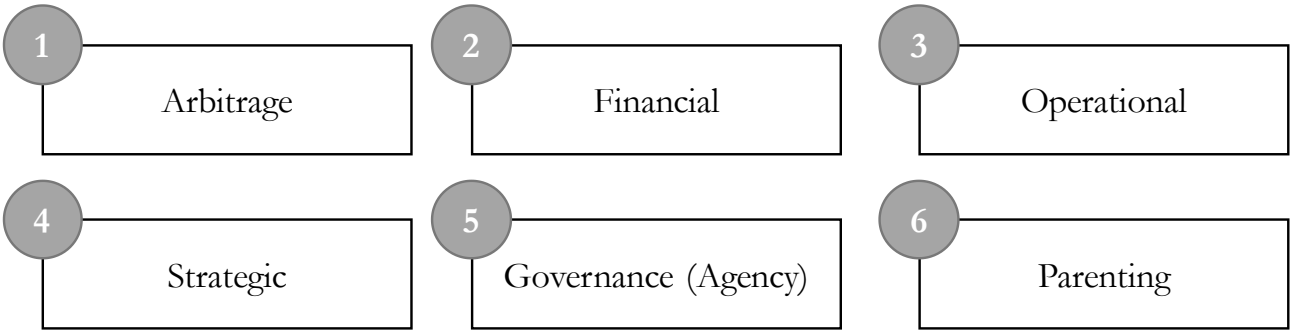
The increase in fund value is important for not only the limited partners, but also the general partners. General partners often invest in the fund alongside limited partners. The investment made by the general partners in the fund is typically minute relative to that made by limited partners (typically less than 10% of the committed capital to the fund). However, the investment represents a key ingredient in the private equity model. The general partners and private equity company managing a given private equity fund are typically remunerated in two ways. An annual management fee is paid by the limited partners to the private equity company. The latter ranges between 1-3% of the committed capital depending on a range of factors, including the experience of the given private equity company, the size of fund, among others. The management fee is typically used for wages, administrative expenses, etc. in the private equity company appointed to manage the fund. The second remuneration facet is the so-called 'carried interest' earned by general partners. Carried interest is a portion of the return generated by the given private equity fund. General partners typically earn carried interest when the given private equity fund's return exceeds a so-called 'hurdle rate'. The hurdle rate is often around 6-10%. General partners earn a percentage of the return made in excess of the given hurdle rate (typically around 20%). Hence, aside from the private equity company merely receiving a management fee, the general partners are incentivized to manage the fund so as to generate a large return, in order to maximize their own investment and carried interest. (Bennedsen et al., 2008; Cendrowski et al., 2012)

2.4. Interaction with portfolio companies – uncovering the private equity toolbox

With an understanding of the basic mechanisms behind a private equity fund and the private equity company managing it, it is relevant to uncover the way in which private equity companies engage with their portfolio companies so as to generate returns for their investors. Berg and Gottschalg (2003) describe the methods of private equity companies. They do so by differing between the two ways in which private equity companies harness value in their investments, namely value capture and creation. Value capture is the way by which private equity companies are able to use their ability to negotiate with sellers/buyers to increase the value of the given portfolio company, but also the private equity company's ability to assess potential portfolio companies to reap hidden value. On the other hand, the authors refer to value creation as the way in which private equity companies' active involvement with a specific portfolio company increases its value throughout the holding period. (Berg & Gottschalg, 2003)

Within the framework of value capture and value creation, Berg and Gottschalg (2003, p. 34) identify six distinct value capture and creation levers. Throughout this thesis, these levers, which are depicted below, will be referred to as the private equity toolbox.

Figure 5: The levers of the private equity toolbox



Source: Own creation based on Berg and Gottschalg (2003, p. 34)

2.4.1. Capturing value in the acquisition and divestiture phases

Given that the focus of this thesis is on operational performance changes, an extensive review of the way in which private equity companies capture value in the acquisition and divestiture phase is unwarranted. This stems from the fact that the value capture in these phases does not relate to the way in which private equity companies seek to improve operational performance in portfolio companies, but rather their attempts to increase investment returns through arbitrage. That being said, it is worth briefly considering these phases, so as to gain a holistic understanding of the private equity business model.

In the acquisition phase, private equity companies attempt to deduce whether a given company represents a suitable investment. They do so by conducting a thorough investigation of the company and using their network of advisors so as to create an understanding of the company's market, history, etc. Hannus (2017, p. 60) notes a range of business and financial criteria that private equity companies typically look for in potential portfolio companies. Business criteria involve e.g. the customer base of a given company, its brand recognition, management team, ownership history, etc. Financial criteria involve e.g. the nature of the company's asset base, the potential for cost reductions through capital structure adjustments, the predictability of cash flow, etc. Better knowledge regarding the latter allows private equity companies to more precisely assess the price and potential of a given company and thereby capture value if other potential acquirers' respective view of the price is distorted. (Hannus, 2017)

While some private equity companies may derive value capture from the ability to understand the workings of a specific business, others may derive value capture from their ability understand the given market in which a company operates. Private equity companies with superior knowledge of future valuation within a given industry may be able to price a given portfolio company more fittingly. (Berg & Gottschalg, 2003; Hannus, 2017)

In the divestiture phase, general partners attempt to make their portfolio companies seem attractive to potential buyers so as to increase price and thereby generate high returns for the fund. Hannus (2017, p. 65-66) notes that general partners commit to the "[…] *practice of 'window–dressing,' i.e. applying specious accounting tricks to bolster the financial statement artificially* […]" as well as deferring "[…] *capital expenditures and necessary reinvestments in order to boost short– term profitability*." The specific approach to capturing value in the divestiture process depends to a certain extent on the method by which the private equity portfolio company is divested. In some cases, potential buyers may contact the given private equity company unexpectedly and make a bid for the company. In other cases, an auction-like process is initiated in which the private equity company hires an investment bank to market the given portfolio company towards potential buyers, both financial and industrial. Finally, some portfolio companies may be exited through a completely different method, e.g. by way of a listing on public exchanges. (Cendrowski et al., 2012)

2.4.2. Value creation in the holding period

Having briefly considered what private equity companies do in the acquisition and divestiture phases, it is even more imperative to consider what they do in the period in between, i.e. the holding period. Once a private equity fund has acquired a given portfolio company, the ways that the private equity company interacts with said company are theorized to create value in a number of ways.

2.4.2.1 Financial optimization

A commonly noted value creation lever during the holding period relates to the way in which private equity companies amend the financial structure of portfolio companies. Given private equity companies' frequent interaction with financial institutions, it has been noted that private equity portfolio companies should be able to utilize their owners' *"*[…] *excellent contacts in the financial community negotiating terms that the portfolio company would not have been able to get on a stand-alone basis*." (Berg & Gottschalg, 2003, p. 17). In keeping with this, Berg and Gottschalg (2003) also note that the mere fact that private equity companies deal with financing decisions on a daily basis should help portfolio companies in regard to their capital structure at the operating company level. This, all else equal leads, to value creation through better utilization of financing mechanisms, and thereby increased operational performance.

Another frequently cited facet of financial optimization in private equity is related to the increase in debt that happens when a company is acquired by a private equity fund (Berg & Gottschalg, 2003; Hannus, 2017). As mentioned, private equity transactions are financed through a large proportion of debt. The payments used to repay this debt are often tax-deductible. Hence, a private equity fund will be able to pay down debt raised to finance a given acquisition using the profits from a given portfolio company, while enjoying a so-called tax shield. This tax shield may increase the value of the given portfolio company (Bennedsen et al., 2008; Berg & Gottschalg, 2003). It is important to note that the latter description of the notion of a tax shield is heavily oversimplified and would require a much deeper discussion of the risks related to debt financing. Yet, one could argue that that role of debt in private equity transactions is analogous to value capture rather than value creation, and hence given this thesis' focus on the latter, it is not deemed imperative to pursue such a discussion. As pointed out by Bennedsen et al. (2008) the debt raised to acquire a given portfolio company is typically raised at the holding company level. Hence, while the tax shields may lead to increased value when looking at a portfolio company as the sum of all entities related to it, it is questionable whether the tax shield is an example of value creation in the operating portfolio company.

2.4.2.2. Operational optimization

Tax shields aside, the involvement of the private equity company with the acquired portfolio company does not solely relate to financial decisions. As noted by Berg and Gottschalg (2003, p. 19) "*Buyouts often substantially change in the way the operations are organized and managed in the target company, with the goal to reduce cost and improve margins* […]". The drive for efficiency is typically associated with optimization of e.g. corporate overhead costs (Berg & Gottschalg, 2003). Private equity companies also seek to "[…] *increase capital productivity and/or reduce capital requirements of the business*." (Berg & Gottschalg, 2003, p. 20). Such

drives for capital efficiency is seen in relation to how portfolio companies manage their inventory and working capital, but also in seeking efficiency in regard to production facilities, i.e. consolidating production sites. (Berg & Gottschalg, 2003)

2.4.2.3. Strategic optimization

Aside from operational optimization, private equity has also been linked with strategic refocusing and strategic honing (Kaplan, 2009). Hannus (2017), for instance, notes that private equity companies can help portfolio companies in regard to their strategy in three ways. Firstly, private equity companies provide a pair of objective glasses that might help portfolio companies refocus on their core. Secondly, private equity companies may see portfolio companies as platforms by which they can build market leaders through inorganic growth strategies – referred to as 'buy-and-build'. In this light, the given private equity company's strategic input comes in the manner of insights related to potential increases in market penetration coupled with the financial capabilities to fund such inorganic growth. Thirdly, given private equity companies' experience within various industries and links to large networks, it is theorized that they can help portfolio companies outperform their peers, e.g. by finding new dynamic executives for the company, formalizing go-to-market strategies, exploiting relationships gathered through past investments, etc. (Berg & Gottschalg, 2003; Hannus, 2017; Kaplan, 2009).

2.4.2.4. Governance and parenting optimization

While the levers relating to financial, operational, and strategic optimization are no doubt interesting, Berg and Gottschalg (2003, p. 25) posit that "*The most prominent and exhaustively described value creation lever in buyouts is the reduction of agency costs* […]". Hence, in terms of the six levers, it is fitting to consider parenting and governance in detail.

A full overview of agency theory and its stipulations could fill an entire thesis. In short, however, the area of research relates to how people are assumed to act rationally and in a self-interested, utility maximizing way (Linder & Foss, 2013). This assumption serves to create frictions when the interests of a principle, e.g. a manager/owner, do not align with a given agent, e.g. an employee. In publicly traded companies or loosely-held private companies, this dilemma between principle and agent can create frictions between shareholders, who derive value from profits by way of dividends, and employees, who typically derive most value through their wages. The power of the individual shareholder to monitor the actions of the agents, i.e. employees, in such businesses are limited. Similarly, the individual shareholders may deter from engaging in such monitoring since other shareholders may "freeride" on the actions of others. On the flipside, an owner/manager within a closely-held private company can be said to be a blockholding

shareholder, who has greater incentive and power to monitor the actions of agents in said business. (Bratton, 2008; Linder & Foss, 2013)

As posited by Bratton (2008, p. 2), "*Private equity buyouts occupy an anomalous but intriguing place in this unsettled governance picture.*" This unique place stems from the aforementioned structure of private equity companies and funds. The general partners act to serve on behalf of limited partners to monitor private equity portfolio companies. General partners have an incentive to do so, given that the carried interest from the private equity fund constitutes a large portion of their remuneration. Given their experience with investments in private companies, the general partners have been noted to have superior monitoring capabilities (Berg & Gottschalg, 2003). In other words, private equity ownership straddles the bounds between loosely held businesses and blockholder held businesses. With general partners acting as representatives of limited partners, they exude power similar to a blockholding shareholder, while limited partners retain some of the diversification risk affiliated with investing smaller amounts.

A less concrete facet of private equity ownership's governance impact is that of the parenting role that private equity companies can have. This parenting effect takes on two forms - the advising/enabling impact that private equity companies have, as well as the role of private equity companies in regard to facilitating entrepreneurial spirit. Berg and Gottschalg (2003) mention how general partners and their network can advise and enable portfolio companies, and that the interplay between multiple portfolio companies held in a fund can create advantageous group dynamics. The aforementioned "group" feel can catalyze new communication channels between managers from different private equity porfolio companies which can enable new ideas, strategic ideas, and cooperation. (Berg & Gottschalg, 2003)

2.5 Sub-conclusion

The preceding Section has explored what constitutes private equity, historical developments in the activity within the asset class, and the general manner in which private equity companies interact with their portfolio companies. It is apparent that the asset class is highly heterogeneous and that it has seen varying levels of activity over time. Yet, the underlying theme in private equity is that it constitutes an illiquid asset class typically reserved for institutional investors who seek equity investments in mature, well-established companies. In doing so, the investors gain some of the benefits affiliated with blockholding shareholdings, while retaining some diversification benefit. Private equity investments are funded, in part by debt, and private equity companies seek to engage with their portfolio companies so as to increase operational performance and thereby pay down debt, to increase the value of the investment.

3. Literature review

With an understanding of private equity as an asset class, one can proceed to dive into the past literature that has explored the operating performance of private equity portfolio companies, and what drives such performance.

3.1. The heterogeneous reality of private equity

Based on the preceding Section, private equity companies appear to have a range of mechanisms by which they, in principle, create value in their portfolio companies during the holding period. If such value creation truly takes place, it should be reflected in the operational performance of portfolio companies. Hence, it is unsurprising that a number of seminal papers by e.g. Kaplan (1989) and Smith (1990) have tried to explore how private equity portfolio companies perform relative their non-private equity owned peers. These authors find that portfolio companies see increased operational performance subsequent to being acquired by a private equity company, as measured by a range of metrics such as return on assets, growth, working capital efficiency, etc. Hence, based on these findings, one would be inclined to think that there is support for the notion that private equity companies can increase operational performance in portfolio companies, and thereby serve as a superior ownership form.

However, more recent research has found contradictory results. Some authors have found mixed results in regard to the performance of private equity owned companies (Guo et al., 2011), and some authors have found inconclusive evidence (Leslie & Oyer, 2008). Studies on e.g. U.K. private equity transactions have echoed the findings relating the positive impact of private equity ownership, albeit noting that improvements in operating performance have been much less pronounced than previously detected in North American studies (Acharya, Gottschalg, Hahn, & Kehoe, 2013; Wright, Wilson, Robbie, & Wilson, 1996). More interestingly in regard to the thesis at hand, a recent study on Danish private equity transactions contradicts the conclusions made by Kaplan (1989) and Smith (1990). Vinten (2008) notes that Danish private equity portfolio companies underperform their peers following a transaction based on a number of financial measures. The author concludes that "*This main finding indicates that the so-called superior PE fund governance model ("Jensen hypothesis") is rejected in the present data.*" (Vinten, 2008, p. 74)

The mixed and contradictory findings relating to the operational performance of private equity portfolio companies relative to their non-private equity owned peers are no doubt interesting in the face of Berg and Gottschalg's (2003) description of value creation in private equity. As such, a further study of the performance of private equity owned companies relative to their peers could add to the existing literature by either confirming or denying whether the private equity ownership model is superior to other

ownership forms. Yet, the emerging theme within private equity research is not whether private equity portfolio companies perform better or worse than their peers, but rather, if certain factors lead to heterogeneous performance outcomes amongst portfolio companies.

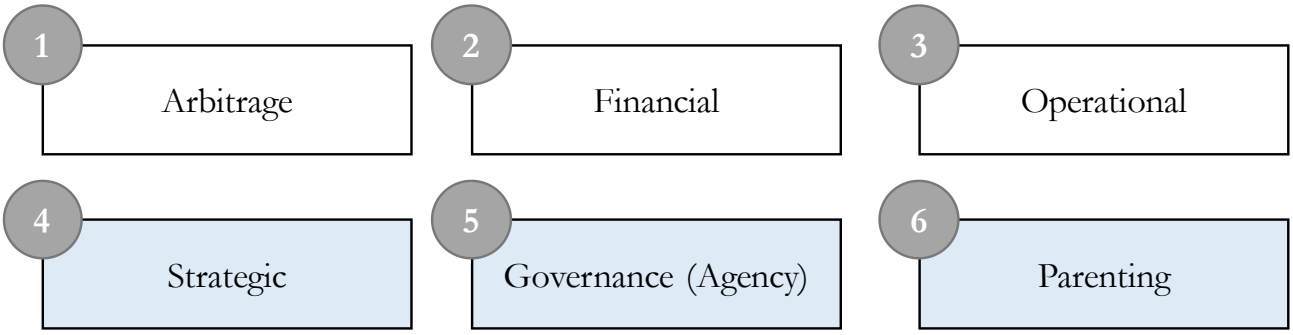
3.2. The changing face of the private equity toolbox

In a perfect world, consistent, detailed splits of which factors of private equity ownership create the most value would allow researchers to focus their attention and efforts. However, while attempts at such splits have been made, the way in which private equity has developed over time inevitably poses a limitation on such analysis. Kaplan and Strömberg (2009) note that two waves of private equity had occurred as of their publication – one in the 1980s and one between 2003-2007. In the first wave, financial and operational optimization were the main levers employed so as to create value. However, the second wave saw an increase in the focus on strategic and governance mechanisms. This is echoed by Klier et al. (2009, p. 7) who note:

> "*Many of today's private equity firms have transformed their management model to reflect the changes in the marketplace. While a strong financial motivation persists, they have increased their operational capacities and now focus more strongly on active ownership and intervention in their portfolio companies*." (Klier et al., 2009, p.7)

As such it appears that private equity companies are no longer focused on merely the financial and operational engineering the characterized the private equity transactions of the 20th century, but increasingly focused on creating value through strategic interaction and active governance (Kaplan & Strömberg, 2009; Klier et al., 2009). In terms of the private equity toolbox, one could posit that the current trends within private equity point to factors relating to governance and strategy as the most salient in regard to value creation in portfolio companies, with factors such as operational optimization and financial engineering taking a back seat. Hence, one could put forth the following revisited private equity toolbox with the value creation levers salient in the current period of private equity highlighted.

Figure 6: The private equity toolbox revisited in the current private equity climate



Source: Own creation based on Berg and Gottschalg (2003, p. 34), Kaplan and Strömberg (2009), and Klier et al. (2009)

3.3. Ownership and governance in action – applying the toolbox

Inevitably, without having access to internal documents from private equity companies, it is extremely difficult to deduce the full spectrum of their actions in regard to the interventionist investment approach highlighted by Klier et al. (2009). In a perfect world, it would be possible to see in which ways the private equity general partners engage with portfolio companies so as to e.g. hone strategy plans or facilitate interaction between portfolio companies. In place of these direct insights previous literature has focused on proxies that gauge the levers used by private equity companies in their portfolio companies. The most prevalent of these proxies have been in relation to the way private equity companies amend strategic direction through formal governance mechanisms such as changing management, but also the extent to which private equity actors are represented in the boards of the acquired companies.

3.3.1. Shaking things up – changes in management

As mentioned, private equity companies will typically conduct an assessment of the management of a given company before investing in it. Private equity companies may determine that the incumbent management has the ability to continue with the existing strategy or the strategy that the new owners intend to pursue. However, private equity companies may also deduce that the given portfolio company's management serves as a bottleneck for the development of the company, or may not have the abilities to implement a potential change in strategy. Hence, it is not surprising that past literature has looked at changes in management so as to gauge not only active ownership by the given private equity company, but also a private equity company's involvement in strategy and removing managerial inefficiencies.

Guo et al. (2011) find that CEO replacement in a private equity portfolio company is positively linked with post-transaction performance, noting significant increases in return on sales and return on assets in companies where such change is made. The authors link the positive effect of CEO change to increased

monitoring and governance by private equity companies. Freelink and Volosovych (2012) also find that changes in management are linked with significant increases in similar metrics. While not studying private equity acquisitions in particular, Parrino and Harris (1999) find that acquired companies see increases in operating performance when their management is changed post-acquisition. They ascribe this to the fact that new owners may detect managerial inefficiencies to a higher extent and thus be inclined to removing them.

The positive findings related to CEO changes are not fully echoed by Cornelli and Karakas (2015). While they generally find ambiguous, statistically insignificant results, the authors do detect some significantly positive results relating to CEO changes in private equity portfolio companies. The authors note that the positive results again could be ascribed to the fact that CEO changes may be linked to improved monitoring and involvement by the given private equity owner. However, the authors further stress that private equity companies may not change management given the fact they might capable enough as is. Hence, while the act of replacing management could be by viewed as a prime example of active involvement by a private equity company, it should not be seen as the only one.

3.3.2. Governance in action – board presence

A more direct way in which previous authors have gauged active involvement in portfolio companies is the presence of private equity company actors on boards of the acquired portfolio company. One does not have to look far into the board characteristics of private equity portfolio companies to see that it is common for e.g. general partners to take on positions on the board following a transaction. Guo and others (2011) find that private equity companies are represented in the majority of boards following a transaction, with most private equity companies taking up around half of the available board seats. From a governance perspective this should not come as a surprise. As noted, general partners serve as the representatives of the new owners of the given portfolio company, namely the limited partners in the given private equity fund. As noted, this representation is part of what makes private equity ownership unique, given that a dispersed array of owners, i.e. private equity investors, see concentrated monitoring efforts by a few members of the acquiring private equity company.

Unsurprisingly, evidence exists relating to the role of private equity-affiliated board members and their impact on value creation. Bottazzi, Da Rin, and Hellmann (2008) study venture capital backed portfolio companies. While not specifically considering the strain of private equity that is in focus in this thesis, it is nonetheless relevant to consider their findings. They note a strong correlation between private equity board presence and portfolio company activities such as recruiting of senior management, raising additional finances, and the level of successful exits, via e.g. IPOs or acquisitions by other companies. In

line with these findings Freelink and Volosovych (2012) find that a larger proportion of private equity affiliated board members is linked with positive developments in post-transaction return on sales and return on assets. These findings are echoed by Cornelli and Karakas (2015).

This positive view of private equity board presence seems further echoed in a comparison of boards in private equity portfolio companies vs. boards in publicly traded U.K. companies. The comparison reveals that boards in portfolio companies are not only more effective, but also more focused on creating value and, inevitably, preparing the exit of the portfolio companies. Public company boards, on the other hand, have a lower focus on value creation, and seem to focus more generally on succession and matters relating to compliance and risk. (Acharya, Kehoe, & Reyner, 2009)

Interestingly, despite the primarily positive connotations related to private equity board presence, there does some to be some degree of heterogeneous findings. Guo et al. (2011) find that a larger proportion of private equity board members is linked to lower post-transaction performance. The authors note that:

> "*This does not necessarily imply a negative role for the PE firm in the governance process; an alternative explanation is that firms with more problematic operations require more direct intervention by the PE firm*." (Guo et al., 2011, p. 500)

Nevertheless, it does appear that the majority of literature supports the notion that active involvement by private equity companies in the boards of their portfolio companies may lead to value creation through the ability to actively exercise the interventionist private equity toolbox.

3.4. The role of inherent predispositions - company and acquirer characteristics

With abovementioned literature in mind, one might be inclined to think that post-transaction performance changes in portfolio companies are solely linked to the aforementioned concrete applications of the value creation levers. However, one might also be inclined to think that specific inherent predispositions, i.e. factors characterizing the given private equity company and portfolio company at hand, could impact the application of the private toolbox, in general, in a more abstract way. This seems especially true in the context of the changing private equity toolbox where mechanical changes in financial structure are no longer the prime catalyst for value creation, but rather, that private equity companies generate value through hands-on interaction with their investments. One example of this is the fact that knowledge of prior ownership traits of a portfolio company may be viewed by some private equity companies as a potential source of arbitrage. However, such pre-existing characteristics may also impact the way and extent to which a private equity company exercises governance or parenting.

Similarly, while governance exists as lever in and of itself, certain characteristics of the acquiring private equity company may impact the way in which governance and monitoring is exercised.

The notion that the toolbox of private equity investors is not immune to other underlying factors is not novel. This is exemplified by multiple previous authors who have researched the role of factors such as culture (Hammer, Hinrichs, & Schwetzler, 2018) and prior ownership traits (Meuleman, Amess, Wright, & Scholes, 2009) in relation to value creation in the current private equity climate. The argument in relation to how certain acquirer characteristics may impact the applicability of the toolbox is nicely summarized by Scellato and Ughetto (2013, p. 2644) who note:

> "[…] *it has recently been recognized that access to relevant resources and capabilities* [from the acquiring private equity company] *plays an important role in explaining post-buyout firm performance* […]" (Scellato & Ughetto, 2013, p. 2644)

Likewise, the relevance of considering pre-transaction ownership characteristics of the companies being acquired is exemplified by research on how investments in e.g. previously family owned companies could "[…] *be affected by the special characteristics of those firms* […]"(Martí, Menéndez-Requejo, & Rottke, 2013, p. 423). In relation to previously private equity owned companies subject to a subsequent private equity investment, Bonini (2012) hypothesizes that the extent of value creation through the use of the current interventionist private equity ownership model may be limited, noting:

> *"Under the null hypothesis that the first private equity investor has been effective in mitigating agency problems by implementing enhanced governance practices, engaging in active management monitoring and reducing free cash flows, it is unclear how a second, back-to-back financial sponsor can continue to create value by exploiting these same mechanisms.*" (Bonini, 2012, p. 7)

As such, as per the motivation given in the introduction of this thesis, it appears salient to not only consider the aforementioned concrete examples of the uses of the toolbox's levers, but also factors that may impact the overall use of the toolbox in the current interventionist climate. In doing so, this thesis follows in the likes of Guo et al. (2011) who not only study post-transaction changes in relation to monitoring and governance, but a number of factors characterizing the acquirer and target pre-transaction, in trying to explain post-transaction performance.

3.4.1. Private equity company characteristics

As hinted at, numerous researchers have focused on whether certain characteristics of the acquiring private equity company play a role in the ability to exercise active ownership in a portfolio company. This thesis will follow this emerging trend. Specifically, two factors will be considered, namely the geographic

origin of the acquiring private equity company and whether the acquiring private equity company sees itself as industry focused. The focus on these factors stems partly from the fact that more and more cross-border transactions are taking place in the European private equity market, but also the fact that private equity funds are increasingly trying to differentiate themselves (Bain & Company, 2018). Other factors could have considered, such as acquirer size or age. Yet the aforementioned focus on foreign and industry focused private equity ownership seems extremely salient in respect to the increased interaction between portfolio company and private equity company that is seen in the current private equity climate.

3.4.1.1. Barbarians at the border – On the role of foreign ownership

In the latest private equity boom, upwards of a third of European private equity transactions could be classified as cross-border (Cornelius, 2011). Surprisingly, a limited amount of research has been dedicated to the role of foreign ownership in relation to post-buyout performance in portfolio companies.

As mentioned, a vital facet of private equity ownership relates to the unique agency situation that private equity transactions represent. Part of this uniqueness comes from the monitoring capabilities of private equity companies and their ability to interact with portfolio companies so as to e.g. hone strategy plans. This seems even more vital in the face of the developments in private equity where governance and parenting have become more impactful. Unsurprisingly, geographic distance has been hypothesized to be detrimental in relation to these value creation mechanisms. As hypothesized by Scellato and Ughetto (2013, p. 2644):

> "*The cost and efficacy of providing monitoring and advice to portfolio companies are likely to be sensitive to the distance between investors and investees* […]" (Scellato & Ughetto, 2013, p. 2644)

Scellato and Ughetto (2013) find support for their hypothesis that private equity portfolio companies supported by domestic private equity companies outperform their peers. In a more granular context, other authors have noted that that private equity portfolio companies acquired by acquirers with a different cultural background also see lower post-transaction performance, albeit at weak levels of statistical significance (Hammer et al., 2018).

Surprisingly, in the face of these findings, a previous thesis on the performance of Norwegian private equity portfolio companies found that those backed by foreign private equity companies saw better performance than their peers. However, the interpretation of these findings may be distorted by the fact that the Norwegian private equity market was underdeveloped at the time of the study and hence, foreign private equity companies were more experienced than home-grown Norwegian private equity companies. (Sandvik, 2009)

Hence, all else equal, it appears that foreignness of the acquiring private equity company may very well have a limiting effect in regard to the company's ability to make use of the governance and parenting levers that have become important in the current private equity climate.

3.4.1.2. A matter of strengths – On the role of focus

Aside from the geographic background of the given private equity acquirer, other authors have looked at the role of acquirer specialization. Even though private equity in and of itself represents a specialization within the investment world, certain private equity companies pride themselves on being specialized in one way or the other. An emerging trend is the specialization of private equity companies within specific industries.

As summarized by Spliid (2014), the rationale for industry focus in private equity stems from the idea that practice makes perfect. The author posits that despite information being free in accordance with classic economic models, the reality is that the efforts related to interpreting and using information may represent hidden costs. Accordingly, private equity companies who maintain efforts at interpreting information on companies in a specific industry(s) may spread these hidden costs over a greater amount of portfolio companies, increasing their abilities to not only spot good investments but engage with portfolio companies in more fruitful ways (Spliid, 2014). This theoretical underpinning is similar to what directs the hypotheses of Cressy, Munari, and Malipiero (2007). They note that specialized private equity companies should be theoretically be able to outperform non-specialized acquirers given two reasons. The first is the reduced information asymmetries that would exist between a given portfolio company and the acquirer, thereby allowing private equity companies to better apply the salient levers of the private equity toolbox. The second explanation stems from the overall reduced uncertainty coupled with investing in something that the private equity partners have prior experience with.

In keeping with their hypotheses, Cressy et al. (2007) find that private equity portfolio companies backed by industry focused private equity companies outperform their peers in relation to a number of profitability measures. This is finding is echoed in a more recent study by Le Nadant, Perdreau, and Bruining (2018), who also find that post-transaction growth increases in private equity portfolio companies who are backed by industry focused acquirers. Given their findings, they conclude that "[…] *that PE firms with specialized experience in the industry in which their portfolio companies are active are more beneficial to their portfolio companies than PE firms without experience in the industry of their portfolio companies*." (Le Nadant et al., 2018, p. 256).

3.4.2. Private equity portfolio companies' prior ownership characteristics

Characteristics of the acquiring private equity company are only one facet of the pre-transaction realm. In keeping with this, a number of authors have studied if certain pre-transaction portfolio company characteristics have detectable impacts on post-transaction performance. This thesis will continue this theme by looking at one factor that has been studied relatively extensively, namely the role of prior private equity ownership, and a factor that has been studied relatively diffusely, namely the role of prior family involvement in a given portfolio company. The focus on these factors is warranted for several reasons. Firstly, transactions where companies are sold from one private equity to another, i.e. secondary transactions, have seen an immense surge in recent years. Secondly, little literature exists on the role of prior family involvement in relation to the performance of private equity portfolio companies.

3.4.2.1. Private equity hand-me-downs – On the role of prior private equity ownership

One does not have to look far into the ownership characteristics of private equity portfolio companies to deduce that a noticeable proportion of private equity transactions relate to companies being sold from one private equity company to the other. This is often termed a 'secondary' transaction. As the private equity industry has developed, the prevalence of such secondary transactions has grown substantially. According to estimates, approximately 2% of private equity transactions measured by the deal were related to secondary transactions in the first wave of private equity, i.e. in the 1980s. This number grew to approximately 25% in the second wave of private equity, i.e. the 2000s (Kaplan & Strömberg, 2009).

In assessing the past literature on secondary transactions, it becomes apparent that many authors assume that secondary transactions are the private equity equivalent of a 'lemon' in the used-car world, i.e. a defective company. Achleitner and Figge (2014, p. 407) note that this pessimistic view has been rooted in three arguments:

- That secondary transactions present little value creation potential given that prior private equity owners should already have applied value creating mechanisms.
- That secondary transactions see increased focus during booms in financial markets and hence, represent opportunities to capture financial arbitrage not present for previous private equity owners, rather than opportunities for new value creation.
- That private equity funds are experts in divesting companies and hence, that secondary buyouts should present a tougher situation for value capture than non-secondary transactions.

Achleitner and Figge (2014, p. 407) consider the abovementioned arguments the so-called 'conventional wisdom' relating to secondary transactions. It is a wisdom seemingly supported by a number of authors.

As an example, Freelink and Volosovych (2012) find that while the equity returns generated by secondary transactions may be positive, the operational performance of secondary transactions declines throughout their holding period. Comparing them against non-secondary transactions, Wang (2012) notes that secondary transactions see inferior changes in profitability as measured by return on assets and return on sales, albeit noting that secondary transactions also perform better in regard to other measures. Bonini (2012) does not fully echo the negativity relating to secondary transactions but notes:

> "*Our results show that companies targeted by multiple buyouts experience abnormal improvements in their operating performance as a result of the first acquisition but do not exhibit signs of incremental changes in performance during the secondary transaction*." (Bonini, 2012, p. 30)

It seems then, that prior private equity ownership may be an underlying factor diminishing the extent to which a subsequent private equity investor can employ the interventionist private equity toolbox. While there may be financial engineering opportunities left from the previous private equity owners, it appears that optimization relating to e.g. strategy and governance is saturated by the time a new private equity owner takes over. Hence, all else equal, the operational performance improvement potential in such transactions may be limited.

3.4.2.2. The family effect – On the role of family ownership

Despite a larger number of private equity transactions being related to previously private equity owned companies, the majority of private equity transactions relate to companies that have previously been owned by non-private equity owners, e.g. family businesses. A 2014 report estimates that over half of all non-financial businesses in Denmark can be considered family companies (Bennedsen & Nielsen, 2014). Yet despite the fact that family companies represent a huge proportion of the investable universe for private equity companies, little research has explored if the characteristics of family companies may impact the ownership approach taken by private equity investors.

Before touching on the sparse findings of prior authors in relation to private equity ownership of previously family owned companies, it is worth considering the theoretical insights that underpin research on family companies. In doing so, it is necessary to define what a family company is. Such definitions have been the basis of much discussion in literature on family companies (Litz, 1995). However, most literature appears to adopt definitions in line with that set forth by European Family Business. According to the latter, a family company can be defined as one in which a given family has the majority ownership and decision rights, coupled with representation on the board (European Family Business, n.d.). In practical terms, this can be interpreted as the notion that a family company is one in which the given

family is represented in management, on the board, and also holds the majority of shares. This approach to defining family companies is reminiscent of what it is proposed by Bennedsen and Nielsen (2014) and will be how this thesis defines family companies henceforth.

One of the prevalent theoretical constructs considered in family company research relates to the concept of 'socio-emotional wealth'. Supposedly, families involved in family companies do not measure the success of their business solely by the operational performance that it generates, but also by the amount of socio-emotional wealth generated. This unique form of wealth relates to "[…] *non-financial aspects of the firm that meet the family's affective needs, such as identity, the ability to exercise family influence, and the perpetuation of the family dynasty*." (Gómez-Mejía, Haynes, Núñez-Nickel, Jacobson, & Moyano-Fuentes, 2007, p. 106). Families seek identification with their local communities and partners through their business, and value the reputation awarded by being able to prosper while helping their peers. Similarly, they value the ability to protect their business so as to be able to allow future generations to continue the work of past generations. In relation to the notion of socio-emotional wealth, it has been hypothesized that family businesses do not seek the same short term profits or high risk projects that non-family businesses might (Gómez-Mejía et al., 2007).

On the flip side, family businesses may seek longer term investments and profits. The notion of socio-emotional wealth is often discussed alongside, or in place of, another theoretical construct seen in family business research, namely 'stewardship'. Similarly to socio-emotional wealth, the notion of stewardship in the context of family businesses relates to the way in which families attempt to preserve the given family company for future generations to come and identify with more than the financial gains that can be made from the business. Supposedly, this trait is what can drive long term profit in family companies, as posited by Miller and Le Breton-Miller (2006, p. 79):

> "*Proposition 2-2. Compared to their competitors, FCBs* [family businesses] *run by family CEOs are apt to manifest more beneficial stewardship behaviors: specifically, fewer shortsighted acquisition and downsizing decisions and more R&D, training, and capital expenditures, and thus more distinctive capabilities that produce higher long-term financial returns*." (Miller & Le Breton-Miller, 2006, p. 79)

The existing literature on the performance of family companies as private equity portfolio companies is less vast than it is how on e.g. how secondary buyouts perform. Yet, one might imagine that family companies would perform worse as private equity investments. Most importantly, in terms of the private equity toolbox, it is apparent that clashes between general partners and e.g. existent family management or board members could occur given the fundamentally different perceptions of what the goal for the

business is. While general partners will seek to drive profits so as to pay debt and increase fund value, existent family involved in the business may hold on to old connotations of socio-emotional wealth and stewardship.

Previous findings seem to support the abovementioned notion that family companies perform worse than their non-family peers. In a comparison with other buyout types, Desbrières and Schatt, (2002) note that family businesses see inferior post-transaction operational performance changes. The authors note that portfolio companies with other prior ownership characteristics should outperform family companies, as "[…] *the departure of the founder* [of family companies] *is often an important risk factor.*"(Desbrières & Schatt, 2002, p. 723) Another study on Spanish venture capital portfolio companies revealed that family involvement was linked to lower post-buyout sales growth and gross margin development (Martí et al., 2013). While not focusing specifically on family companies, Vinten, (2008) finds that operational performance is lower for portfolio companies that see post-transaction decreases in ownership concentration. In interpreting these results, the author notes that this could be the case in situations where private equity acquires a family company since these would typically have seen higher ownership concentration prior to a transaction.

In sum, private equity literature is notably disparate on the role of family ownership in relation to post-transaction performance. Yet it appears that certain characteristics of family companies may deter the implementation of the private equity toolbox and thereby lead to lower levels of performance relative to portfolio companies that were not previously family owned.

3.5 Sub-conclusion

The literature review has uncovered the heterogeneous nature of private equity portfolio company performance and the current state of the application of the private equity toolbox. It is apparent that the toolbox's application is changing in nature and in tune with this, certain concrete actions as well as inherent predispositions have been hypothesized and found to impact post-transaction operational performance changes. An overview of the literature considered in detail is presented in Table 1. The table is presented in horizontal orientation so as to ensure legibility. Table 1 not only maps the findings of the literature reviewed, but also notes the approach taken in the individual papers, something that will be useful in subsequent Sections of this thesis:

Table 1: Findings from past literature in regard to ownership/governance factors' impact on operational performance in private equity portfolio companies

Author(s)	Geo.	Sample	Findings	Metrics	Period	Methodology
Findings in regard to concrete uses of the private equity toolbox's levers						
Guo et al. (2011)	U.S.	68/88	CEO change linked with superior post-transaction performance. High levels of PE board presence linked with inferior post-transaction performance.	ROA, ROS	t-1 to last year of holding period	Change, OLS Regression
Freelink and Volosovych (2012)	U.K.	89	CEO change linked with superior post-transaction performance. High levels of PE board presence linked with superior post-transaction performance. Focus on secondary transactions.	ROA, ROS	t-1 to last year of holding period	Change, Wilcoxon Signed Rank Test
Cornelli and Karakas (2015)	U.K.	67	CEO change ambiguously linked with superior post-transaction performance. High levels of PE board presence linked with superior post-transaction performance.	ROA, ROS, Profit Margin	t-1 to last year of holding period	Change, 2SLS Regression
Findings in regard to the role of acquirer characteristics						
Cressy et al. (2007)	U.K.	122	Industry focus linked with superior post-transaction performance.	ROA, Sales	t-0 to t+3	Level, Heckman Selection and OLS Regression
Sandvik (2009)	Norway	16	Foreign ownership linked with superior post-transaction performance.	ROE, ROA, EBIT Margin	t-1 to t+1, t+2, t+3	Change, Wilcoxon Signed Rank Test
Hammer et al. (2012)	Europe	946	Cultural differences weakly linked with inferior post-transaction performance.	Sales, EBIT, ROA, Asset Turnover	t-1 to t+3	Change, OLS Regression
Le Nadant et al. (2018)	France	217	Industry focus linked with superior post-transaction performance.	EBITDA Margin, Sales	t-3 to t+3	Change, MLR

Scellato and Ughetto (2013)	Europe	241	Domestic ownership linked with superior post-transaction performance.	ROA	t-1 to t+3	Level, OLS Regression
Findings in regard to the role of prior ownership characteristics						
Desbrières and Schatt (2002)	France	161	Prior family involvement linked with inferior post-transaction performance.	ROE, ROI, various margins	t-2, t-1 to t+1, t+2	Changes, T-test and Wilcoxon Signed Rank Test
Vinten (2008)	Denmark	73	Post-transaction decreases in ownership concentration linked with inferior post-transaction performance.	Various ROA, Asset Turnover, ROCE, Assets	N/A	Level, Difference-in-Difference
Bonini (2012)	Europe	163	Prior private equity ownership linked with inferior post-transaction performance.	EBIT/EBITDA Margin	t-1 to t+2	Change, Wilcoxon Signed Rank Test
Freelink and Volosovych (2012)	U.K.	89	Private equity portfolio companies with prior private equity ownership see decreased operational performance throughout holding period.	EBIT/EBITDA Margin, ROA,	t-1 to last year of holding period	Change, Wilcoxon Signed Rank Test
Wang (2012)	U.K.	94	Prior private equity ownership linked with inferior post-transaction performance in some respects, and superior performance in others.	Various	t-2, t-1 to t+1, t+2, t+3	Change, Wilcoxon Signed Rank Test
Martí et al. (2013)	Spain	644	Venture-capital backed portfolio companies that receive minority investments and were previously family owned are linked with inferior post-transaction performance.	Sales, Employees, Gross Margin	t-1 to t-0	Change, GLS Regression
Achleitner and Figge (2014)	Global	936	Prior private equity ownership not statistically linked with any differences in post-transaction performance compared to other transactions.	EBITDA, Sales, EBITDA Margin	t-0 to last year of holding period	Change, Heckman Selection and OLS Regression

4. Hypotheses development and creation of conceptual model

Having explored the current state of the private equity toolbox's use, salient concrete examples of the levers in action, and select underlying factors that may impact the application of the toolbox in the current climate, it is relevant to combine the insights in a conceptual model. Before doing so, it is imperative to summarize the insights gained thus far in the form of concrete, testable hypotheses.

In regards to the concrete actions that private equity companies can pursue, two factors were considered. In regards to the management of the portfolio company at hand, it has been noted that past literature has found mostly positive relationships between CEO changes and post-transaction operating performance. This has been ascribed to the fact that changes in management represent a concrete example of the active involvement of the private equity owner in the strategy of the company. Hence, the following hypothesis is posed:

Hypothesis #1: Private equity portfolio companies that experience CEO changes following the transaction see superior post-transaction operational performance changes.

Secondly, it was noted that private equity boards are noted for their superiority in regards to efficiency and focus on value creation. While there are some contradicting findings, it appears that the bulk of research acknowledges that higher degrees of involvement by private equity actors in the boards of their portfolio companies will lead to more active ownership and thereby value creation. In keeping with this, the following hypothesis is posed.

Hypothesis #2: Private equity portfolio companies that see high levels of representation by private equity board members see superior post-transaction operational performance changes.

Aside from concrete actions taken in portfolio companies in light of the current application of the private equity toolbox, it seems that characteristics of the acquiring private equity company may have an important impact on ability to employ the private equity ownership model as a whole. Specifically, the physical and cultural constraints imposed by foreign ownership appear to limit the fruits of active ownership. Hence, the following hypothesis is posed:

Hypothesis #3: Private equity portfolio companies that are acquired by domestic private equity companies see superior post-transaction operational performance changes.

While being owned by a foreign private equity company may limit the extent to which a given portfolio company can reap the benefits of private equity ownership, being owned by an industry focused private equity company may be advantageous. As noted, industry focused private equity companies may be better

active owners given their unique insights and capabilities, but may also simply be better at picking the right portfolio companies to invest in. As such, the following hypothesis is posed:

Hypothesis #4: Private equity portfolio companies that are acquired by industry focused private equity companies see superior post-transaction operational performance changes.

In line with literature on prior portfolio company characteristics the preceding literature review considered two separate factors. One factor related to the applicability of the private equity toolbox in regard to secondary transactions. The fundamental notion underpinning most of the research is that secondary transactions do not have the same potential to experience the fruits of the private equity toolbox as first-time transactions. While there is some research noting ambiguous results relating to secondary transactions, the majority of research appears to see secondary transactions performing worse than their peers. As such, the following hypothesis is posed:

Hypothesis #5: Private equity portfolio companies that have previously been owned by private equity companies see inferior post-transaction operational performance changes.

The negative connotation relating to prior private equity ownership is echoed, albeit due to different reasons, in the findings relating to prior family ownership. Given the fact that private equity ownership threatens to remove the uniqueness of family companies, and the fact that prior family ownership may impact the implementation of the interventionist private equity toolbox, the following hypothesis is posed:

Hypothesis #6: Private equity portfolio companies that can be categorized as having previously been family companies see inferior post-transaction operational performance changes.

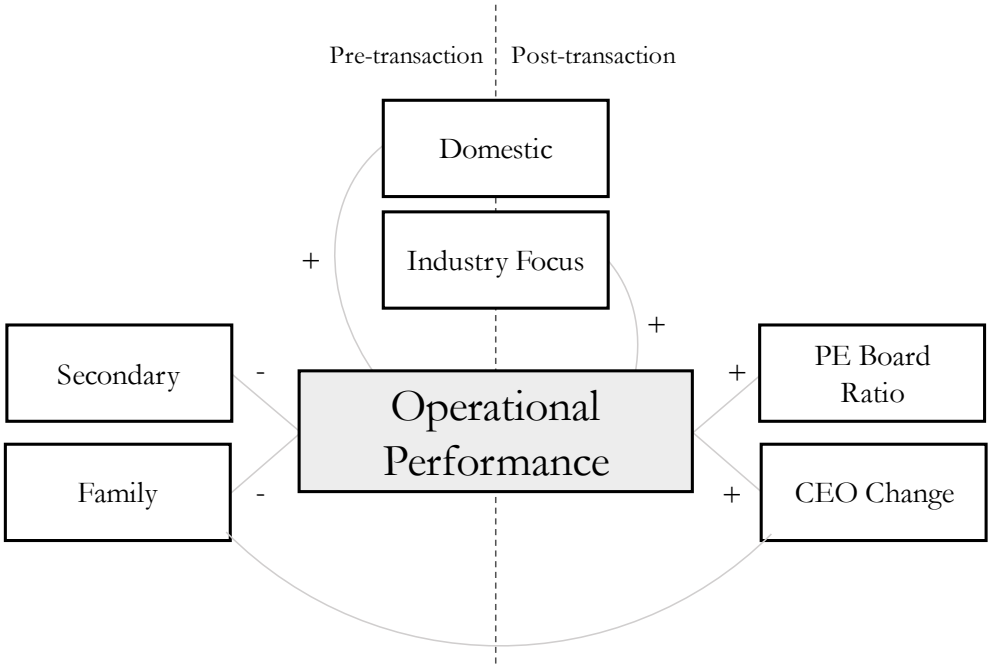
Given the uniqueness of family companies and the lack of findings within private equity research, a further hypothesis is posed in relation the interplay between prior family ownership and management change. As noted, family companies are, by definition, led by the family at hand. Hence it could be hypothesized that keeping the management in a previously family owned company could lead to clashes with the private equity ownership model and vice versa. Hence:

Hypothesis #7a: Private equity portfolio companies that can be categorized as having previously been family companies, that do not experience CEO changes, see inferior post-transaction operational performance changes.

Hypothesis #7b: Private equity portfolio companies that can be categorized as having previously been family companies, that do experience CEO changes, see superior post-transaction operational performance changes.

Based on the hypotheses posed above one can develop the following model, which shall serve as the conceptual backbone for the thesis:

Figure 7: Conceptual model depicting select pre- and post-transaction ownership/governance factors' impact on changes in post-transaction operating performance



Source: Own creation

The model introduced above should be seen in light of the preceding Sections as an amalgamation of Berg and Gottschalg's (2003) typology of the private equity toolbox, the developments in the use of said toolbox noted by e.g. Klier et al. (2009), and the inherent predispositions that have been found to impact applicability of the toolbox based on previous literature. In essence, the model incorporates the levers salient in the current private equity wave, i.e. governance and strategic interaction, but recognizes that the applicability of the private equity toolbox, in its current form, is impacted by various inherent predispositions.

5. Method employed in empirical analysis

Moving away from the findings of others, it is now fitting to introduce the method by which this thesis will conduct an empirical analysis to test the aforementioned hypotheses.

5.1. Measuring operational performance

Before introducing the statistical approach by which the thesis will test the aforementioned hypotheses, it is imperative to concretize the notion of operational performance. Table 1 indicates that previous

authors have considered operational performance in different ways. Some authors have studied absolute levels of operational performance in portfolio companies, whereas the majority have studied changes in operational performance, i.e. differences in the level of performance between two points in time. This thesis adopts the latter approach since the focus is not on whether a specific portfolio company has a higher or lower level of operational performance relative to others, but rather which factors impact changes in a given company's operational performance following the given transaction.

The measures that have been used in measuring operational performance changes in previous literature are plentiful, as also indicated in Table 1. Profitability measures, in particular, have been the focus of most studies and hence, for the sake of focus, this thesis studies changes in operational performance through the lens of profitability measures. Looking at past studies, the primary choice of profitability measures have related to either a portfolio company's ability to generate profits relative to balance sheet measures or relative to other measures such as employees and sales.

Danish financials are limited in the sense that only certain companies are required to report sales data. Likewise, employee data is limited for many companies and prone to reporting errors. Hence, in line with a previous study on the performance of Danish private equity portfolio companies by Vinten (2008), this thesis focuses on changes in return on capital employed[2] and return on assets[3]. The author takes inspiration from Vinten (2008) and considers two variations of the ROA measure, one using net income in the numerator[4], and the other using earnings before interest expenses and taxes[5]. The formulas for these profitability measures are presented below:

$$ROA = \frac{NI\ or\ EBIT}{Assets} \qquad ROCE = \frac{EBIT}{Assets - Current\ Liabilities}$$

In keeping with the fact that the thesis considers changes in operational performance, it is necessary to specify an 'event period' in which the given change is measured. Based on Table 1, one can deduce that varying event periods have been employed in previous similar studies. A common thread is the fact that most studies use the year prior to a portfolio company being acquired, i.e. t-1, as their base year. This allows changes to be measured relative to operational performance prior to a private equity company acquiring the given portfolio company.

[2] Hereinafter, ROCE
[3] Hereinafter, ROA
[4] Hereinafter, NI
[5] Hereinafter, EBIT

The year that the base year is compared to is more divergent, with some authors even measuring operational performance changes from the year prior to a transaction till the year of divestment (Guo et al., 2011). While the latter would no doubt have been amicable, it would have greatly limited the amount of observations that could have been included in the sample. Adopting this approach would have required a sample to be constructed using only divested portfolio companies. Since the focus of this thesis is on portfolio companies acquired between 2010 and 2016, this inevitably represents an unamicable restriction. As such, similar to Hammer and others (2018), this thesis considers a shorter event period consisting specifically of the fiscal year prior to the given transaction till the second fiscal year following the transaction, i.e. t-1 to t+2. Bonini (2012, p. 12-13) notes that there is "[…] *strong evidence that most of the performance change* [in private equity portfolio companies] *is achieved during the first 2 years including the acquisition year* […]". Hence, the event period should capture relevant changes in operational performance. Likewise, as of this thesis' writing, only 2018 financials were readily available, and hence given the focus on transactions taking place between 2010 and 2016, the use of t+2 was also necessitated by data constraints.

In sum, the thesis defines raw post-transaction operational performance changes as follows:

$$\Delta Operational\ performance_{Raw} = Profitability_{t+2} - Profitability_{t-1}$$

Alas, merely considering the raw changes in operating performance ignores the fact that the private equity transactions in focus have taken place in different years and different industries. While trying to adjust for time and industry differences is no doubt difficult, previous studies have attempted to do so by employing adjustments to their measures of operational performance changes. This approach seems rooted in a paper by Barber and Lyon (1996), who propose the following method of detecting abnormal operational performance changes:

$$\Delta Abnormal\ operational\ performance = (P_{i,t} - P_{i,t-1}) - (P^{j}_{i,t} - P^{j}_{i,t-1})$$

In the above $P_{i,t}$ represents a company's operational performance at time *t*, e.g. a level of ROA. $P^{j}_{i,t}$ represents the level of performance for a given control group, e.g. companies within the same industry, at time *t*. Hence, one can detect 'abnormal' operational performance changes by subtracting any potential developments in operational performance for similar companies.

In keeping with this, prior authors (see e.g. Meuleman et al. (2009)) have studied the operational performance changes of portfolio companies adjusted for the development in operational performance for companies in the same industry over the same time period as the given event period being studied. This thesis takes a similar approach, but rather than applying averages in deducing this change, like

Meuleman et al. (2009), medians are employed. This is warranted since Denmark is a small country and hence, some industries consist of a small number of companies relative to others[6]. Using averages in these industries may lead to outliers distorting adjustments. The use of medians is further warranted given the fact that Barber and Lyon's (1996) original article notes the use of medians as opposed to averages, and the fact that multiple other authors, such as Bergström, Grubb, & Jonsson (2007), Guo et al. (2011), and Hammer et al. (2018), have followed similar approaches.

As such, the adjusted measures of operational performance changes are as follows:

$$\Delta Operational\ performance_{Adjusted} = \Delta Operational\ performance_{Raw} - \Delta Operational\ performance_{Industry}$$

This equation is identical to what is seen in similar literature, e.g. Bergström et al. (2007) and Hammer et al. (2018). Throughout, the thesis the abnormal changes in the different metrics will be denoted ΔROA, NI; ΔROA, EBIT; ΔROCE, when considered in isolation.

5.2. Statistical approach

5.2.1. Choosing between statistical approaches

Having ascertained the method by which this thesis will measure operational performance changes it is now fitting to assess how the thesis will analyze the measures in relation to the hypotheses derived in the literature review.

As seen in Table 1, an array of statistical methods have been used to assess if certain factors impact the operational performance changes seen in portfolio companies. Some authors have used some tests of differences averages/medians to compare groups of portfolio companies, e.g. comparing the median operational performance change of secondary transactions with non-secondary transactions (Bonini, 2012). This approach seems to have been taken in in studies with limited sample sizes. However, a mere test of differences in averages/medians is somewhat limited by the fact that such methods do not allow the researchers to control for multiple factors at one time, e.g. the fact that a specific portfolio company may have been the result of a secondary transaction, but also experienced a CEO change, and been a very large company prior to the transaction. The fact that a test of medians only considers one facet of this portfolio company undoubtedly poses a drawback.

[6] The median number of companies involved in the individual industry adjustments was approximately 300, yet a number of industries had far fewer companies.

Given this drawback a number studies with larger samples have harnessed the power of regression in its many forms. The power of regression approaches is that one can control for the factors exemplified above. This study employs a sample that is just large enough to warrant usage of regression. Hence, the thesis follows in the footsteps of Meuleman et al. (2009), Guo et al. (2011), as well as Hammer et al. (2018) in applying ordinary least squared regression[7] to study changes in operational performance. Before preceding to do so, it is fitting to explore the assumptions and the implementation of such regression.

5.2.2. The mechanics of OLS regression and hypothesis testing

OLS regression is a statistical method that allows for the exploration of a given variable, the so-called dependent variable, in relation to one or more other variables, the so-called independent variable(s). In this specific context, the dependent variable is the changes in operational performance. The independent variables include the factors predicted to have an impact on said changes in performance, as per the conceptual model and hypotheses. When conducting OLS regressions in which multiple independent variables are employed[8], the approach allows inferences to be made regarding one independent variable while controlling for the effect of other independent variables. In other words, one can infer the effect of one independent variable, controlling for the effect the others. This is powerful given the fact that the approach then allows operational performance changes to be studied in relation to the given ownership/governance factors, while also controlling for other factors. (Agresti, Franklin, & Klingenberg, 2017)

The basic form of a multiple regression model is shown below (Agresti et al., 2017):

$$\mu_y = \alpha + \beta_1 x_1 + \beta_2 x_2 + \ \dots \beta_n x_n$$

Applied to a given sample and not a population, the equation takes on the following form. The coefficients in the model are estimates of the true coefficient parameters and ε_i represents an error term (Agresti et al., 2017):

$$\hat{y} = a + b_1 x_1 + b_2 x_2 + \ \dots b_n x_n + \varepsilon_i$$

In the above, a represents the so-called intercept, which is the predicted value of the dependent variable, $\hat{y}$, when all independent variables take on a value of zero. The coefficient b_n is the effect of independent variable, x_n, on the dependent variable, $\hat{y}$, ceteris paribus, given an 1-unit change in x_n. It is important to note that while the dependent variable in OLS regression must be continuous, independent variables

[7] Hereinafter, OLS regression
[8] Typically referred to as multiple regression

can be binary in nature (Agresti et al., 2017). This is of course very relevant to the thesis at hand, since many of the hypotheses relate to binary factors, e.g. being acquired by a domestic private equity company or experiencing a CEO change.

In the specific context of this thesis then, one can present the model as follows:

$$\Delta Operational\ performance_{Adjusted} = a + b_1x_1 + b_2x_2 + \ \dots\ b_nx_n + \varepsilon_i$$

In the above, the independent variables include the factors hypothesized to impact changes in operational performance and their coefficients represent said impact. As previously alluded to, a number of further independent variables will be included in the regression to control for exogenous that may also explain operational performance changes, but do not relate to the hypotheses at hand. These will be termed 'control variables'.

In predicting the regression model, the OLS technique, in essence, fits a line between an independent variable(s) and a dependent variable. In doing so, the technique attempts to minimize the distance between the observed data in a given sample, and the predicted values given by the fitted line. OLS regression gets its name from the method in which the technique tries to minimize this distance, namely by trying to minimize the squared distances. (Agresti et al., 2017).

When a model has been fitted to a given sample, one can test whether the model has so-called statistical significance. This entails proposing two hypotheses, the null-hypothesis, H_0, and the alternative hypothesis, H_a. The null-hypothesis asserts that all of the coefficients for the independent variables included in the model are zero. In essence, the null-hypothesis asserts that the model in question is no better than a model that has no independent variables, but solely includes an intercept term. On the flip side, the alternative hypothesis stipulates that at least one of the coefficients is not equal to zero (Agresti et al., 2017), i.e.

$$H_0: b_1 = b_2 = \ \dots = 0$$

$$H_a: At\ least\ one\ b_n \neq 0$$

One can then use the so-called *F*-test to test the hypotheses. The *F*-test is based on the following test statistic:

$$F = \frac{Mean\ square\ for\ regression}{Mean\ square\ error}$$

The numerator in the test statistic is the mean of the squared differences between the predicted values and the mean of the dependent variable, while the denominator is the mean of the squared differences between the observed values and the predicted values. (Agresti et al., 2017)

Having calculated the test statistic, one can use the *F*-distribution to deduce the probability for which the test statistic would have occurred under the assumption that the null-hypothesis was true, known as the so-called p-value. If this probability is low, one can infer that there is reason to reject the null-hypothesis, i.e. that the model is better than a model with solely an intercept term. The levels of probability used to make such inferences are referred to as significance levels. Conventional significance levels are 0.01, 0.05, and 0.1. (Agresti et al., 2017). This thesis further considers 0.15 as a significance level, in line with Freelink and Volosovych (2012).

If the model as a whole is statistically significant, one can proceed to testing the significance of each predicted coefficients. This is where OLS regression is powerful in regard to the thesis at hand, which seeks explore the impact of the individual ownership/governance factors on the dependent variable, operational performance changes. To do so, one again has to propose a set of hypotheses. The null-hypothesis asserts that the coefficient for the given independent variable is zero. In essence, the null-hypothesis asserts that the given independent variable does not have an impact on the dependent variable. On the flip side, the alternative hypothesis stipulates that the coefficient is not equal to zero (Agresti et al., 2017), i.e.

$$H_0: b_n = 0$$

$$H_a: b_n \neq 0$$

Similar to assessing the significance of the model as a whole, one can use a test to explore these hypotheses, namely the *t*-test. The *t*-test is based on the following test statistic:

$$t = \frac{(b_n - 0)}{se}$$

The numerator in the above is self-explanatory and the denominator, i.e. the standard error, represents an estimate of the population standard deviation for the given coefficient. Using *t*-distribution, one can deduce the probability for which the given *t*-value would have occurred under the aforementioned null hypothesis. If this probability is low, one can infer that there is reason to reject the null-hypothesis, i.e. that the coefficient is zero. If this is the case, it is possible to interpret the coefficient of the given independent variable. (Agresti et al., 2017)

5.2.3. Assumptions and requirements for the use of OLS regression

An array of assumptions need to be met for the regression to be employed correctly. As per Wooldridge (2016, p. 139-140), the classic assumptions for multiple OLS regression stipulate that:

- the relationship between a given independent variable and dependent variable is linear
- the data employed is gathered randomly
- the independent variables do not show perfect collinearity
- there is variance in the independent variables
- the population error term has an conditional mean of zero
- the residuals, i.e. differences between the predicted and observed values, have a normal distribution and do not vary (i.e. are homoscedastic and independently distributed)

The majority of the assumptions are easily confirmed, e.g. the requirement for variance in the independent variables and lacking perfect collinearity, and the data employed in this thesis largely conforms with the abovementioned assumptions. However, upon inspection of the residuals resulting from the regression analysis, it became apparent that the assumption of homoscedasticity is violated in certain models. Thus, following the likes of the most authors studying the performance of private equity portfolio companies (Achleitner & Figge, 2014; Cressy et al., 2007; Martí et al., 2013; Meuleman et al., 2009), the thesis employs Huber-White heteroscedasticity-robust standard errors throughout[9]. No severe departures from normality assumption have been observed using classic diagnostics such as QQ/PP-plots or residual histograms. However, it is worth noting that the aforementioned robust standard errors have been used in regards to slight departures from normality, despite not being formally developed for the issue (Pek, Wong, & Wong, 2018).

Having ascertained the fulfillment of the formal assumptions of OLS regression, it is worth noting that certain further conditions have been become commonplace in the context of regression, e.g. a sufficient sample size and that outliers have been assessed/dealt with. (Agresti et al., 2017)

Harrell (2015) notes that a minimum of approximately 10 observations should be included per independent variable in regression analysis. The sample size used in this study[10] adheres to the aforementioned rule and similar sample size rules set forth by e.g. Van Hoornis & Morgan (2007). Importantly, the sample is highly reminiscent in size to that employed by Guo et al. (2011), from which the author derives much methodological inspiration, and exceeds the samples used in previous theses

[9] The calculation of these is done using Stata's built-in "robust" option
[10] A detailed derivation of the sample will be derived in following Sections (N = 83)

also studying private equity performance using regression analysis (see e.g. Knudsen and Clausen (2015) and Lund-Nielsen (2010)). That said, the sample size is ever so slightly below the recommendations set forth by Green (1991), and is undoubtedly on the smaller side compared to large-scale studies of private equity performance. This is important to note, as the trustworthiness of inferences made from a regression analysis increase, ceteris paribus, with sample size[11].

Outliers in the data can heavily affect the OLS regression models given the mechanics by which the approach fits models to the data. Hence, inclusion of outliers can distort inferences made using predicted coefficients. This is especially true in models that use small samples (Wooldridge, 2016). An array of approaches exist in relation to dealing with outliers. In keeping with the comments regarding the sample size at hand, this thesis deals with outliers in continuous variables by Winsorization, so as to maintain as many observations in the sample as possible. As opposed to dropping outliers, Winsorization replaces outlier values with less extreme values from a given percentile. Winsorization is the most commonly used approach to deal with outliers within finance literature (Adams, Hayunga, Mansi, Reeb, & Verardi, 2019) and is seen frequently in the previous similar literature on private equity performance, e.g. in Hammer et al. (2018). Given the effects of outliers on small samples, visual inspection of the data, and the recommendations set forth by Blaine (2018), Winsorization has been conducted at the 5th percentile for relevant variables. This approach to Winsorization is identical to that taken by e.g. Svanberg and Wanzelius (2013).

5.2.4. A comment on different uses of OLS regression

It is important to note that this thesis employs OLS regression for its exploratory rather than predictive capabilities. In predictive uses of regression, e.g. seen within machine learning, regression models employ the independent variable(s) that best predict a given dependent variable. In essence, predictive uses of regression seek to find the model that best explains variation in a given data set. This can e.g. be deduced from a given model's so-called R^2 value, an indicator of how much of the variation in the dependent variable is explained by the model. (Agresti et al., 2017; Shmueli, 2010)

In the thesis at hand, the intent is not to try to predict operational performance changes and build the perfect model so as to do so. Rather, the intent is to explore an array of factors' impact on changes in operational performance. Hence, the use of regression is exploratory in nature. This means that while model fit, as indicated by R^2 values, is inevitably important to consider, the main focus in the use of OLS regression is the ability to test the significance of individual variable coefficients. Furthermore, given that

[11] The sample size has been discussed with- and approved by the supervisor

the hypotheses do not specify levels of changes, but rather directions, the numerical values held by the coefficients of the independent variables are of little interest relative to their signs, i.e. whether they are negative or positive. (Shmueli, 2010)

5.3. Sub-conclusion

In short, the thesis at hand sets out to explore the hypotheses and conceptual model using OLS regression, as per the model presented below:

$$\Delta Operational\ performance_{Adjusted} = a + b_1x_1 + b_2x_2 + \ \dots\ b_nx_n + \varepsilon_i$$

The dependent variable employed in the regression model is a measure of change in operational performance from t-1 to t+2, adjusted for industry developments. The independent variables are the factors hypothesized to impact operational performance change, alongside a number of control variables that seek to mitigate the impact of exogenous effects.

6. Empirical analysis

Given the understanding of the statistical approach that will be employed to test the hypotheses, one can now proceed to conducting the empirical analysis. Inevitably, so as to conduct regression analysis, a dataset is needed. Hence, this Section will start by introducing the data collection process and the characteristics of the sample at hand, before presenting the results of the regression analysis.

6.1. Data

6.1.1. Identifying a sample

The sample used in this thesis is based on the private equity transaction list published by the Danish Venture Capital and Private Equity Association[12]. This list notes all transactions having taken place in Denmark since in 1986 that are related to the realm of private equity in one way or another. The list notes the names of the acquisition, the acquirer(s), and month/year in which the transaction took place. While the list includes upwards of 800 potential observations since in 1986, the sample employed in this thesis is subject to a number of constraints which reduces the number of observations.

As per the delimitation, this thesis' focus is on Danish private equity portfolio companies, i.e. Danish companies acquired by Danish or foreign private equity funds. This focus is warranted by multiple factors. Firstly, data collection on portfolio companies in multiple geographies would have been extremely time-consuming, if not impossible, given some of the matters that are in focus in this thesis,

[12] Hereinafter, DVCA. The list that was used as the foundation for the sample creation was accessed in December 2019.

e.g. whether a company was family owned prior to a transaction and if changes in management took place. A number of transactions in the DVCA list relate to foreign companies. As such these were excluded. Secondly, as per the motivation of the thesis previously mentioned, little contemporary analysis has considered the Danish private equity realm in focus. The most recent large-scale study on Danish private equity portfolio companies was conducted by Vinten in 2008. This is also why the thesis considers solely companies acquired in transactions that took place from 2010 to 2016. Prior analysis has already analyzed transactions taking place before the crisis, and as per the description of the development in levels of transactions over time, one can infer that the 2010 marked the start of a new period of private equity investments. 2016 was set as an upper limit given the need for financial data from the fiscal year two years after the transaction, as per the event period being studied.

Alas, further considerations had to be taken in regard to the sample being considered. The DVCA buyout list includes transactions that go beyond the definition of private equity considered in this thesis. Only transactions relating to the acquisitions of a majority stake in the given portfolio company were included in the sample. This stems from the notion that private equity companies can only truly engage in the type of active ownership described previously when they are majority owners of a portfolio company (Vinten, 2008). The DVCA list only sporadically notes whether the stake acquired is a majority or not. As such, it was necessary to analyze each individual transaction to ascertain if it could be included or not. An initial screening using the Zephyr[13] database allowed a large number of transactions to be categorized as majority or minority transactions. However, in a number of cases, the author had to manually deduce whether the transaction related to a majority or minority ownership stake. This was done using press releases relating to the transactions, annual reports, and importantly, using a number of databases that report ownership stakes in private companies, namely Greens, Orbis, and Valu8.

A not insignificant amount of transactions noted in the DVCA buyout list are related to so-called add-on investments, i.e. in which the company being acquired is not a standalone investment, but rather an addition to an existing portfolio company. Given that these transactions relate to a pre-existing portfolio company, they were disregarded. This in line with the methodology employed by e.g. Hammer et al. (2018). Furthermore, as per the event period specified previously, the companies included in the sample had to have financials available one year prior to the transaction till two years after the transaction. This meant removing a number of abnormal transactions, e.g. transactions that were so-called buy-and-build/fusion cases, e.g. where two companies are bought and merged immediately. In the aforementioned

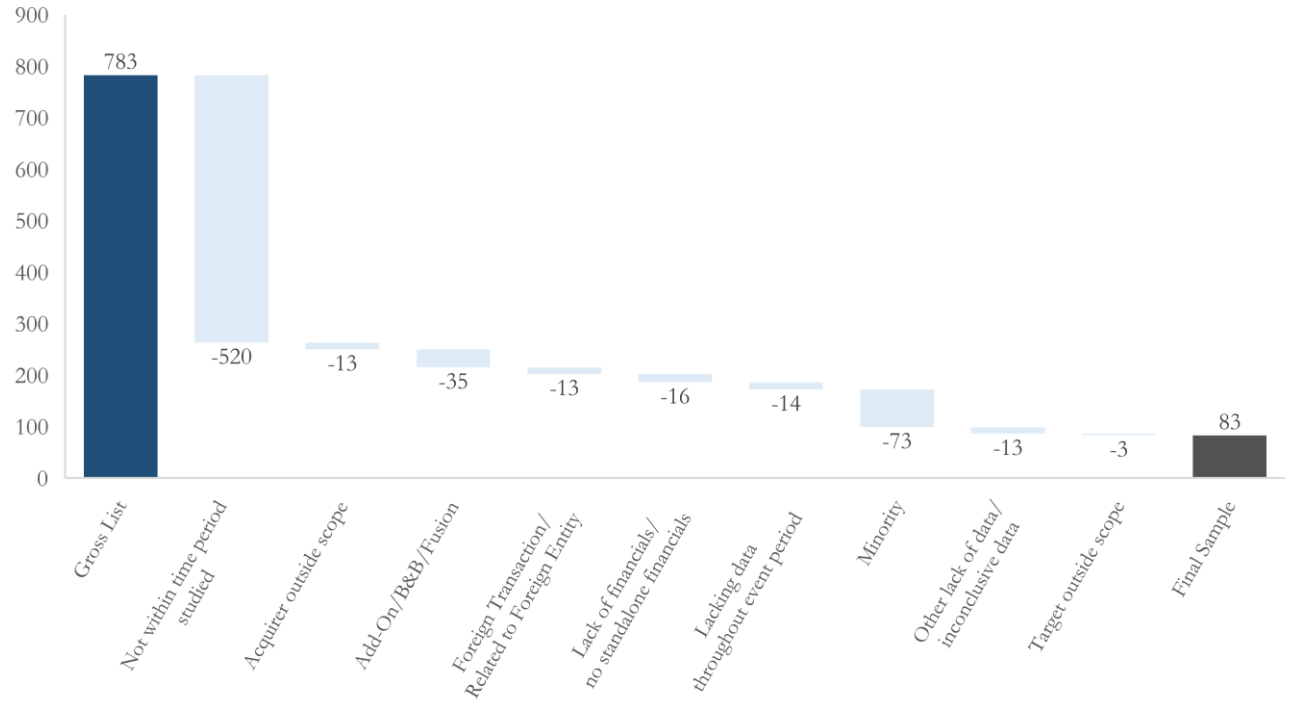
[13] A description of the databases used in the data collection process can be found in Appendix 1

case, it would not have been possible to correctly which pre-transaction financials to use. This approach is also employed by Guo et al. (2011).

The DVCA list also noted a number of transactions that were either not related to private equity companies, i.e. the acquirer was not a private equity company as per this thesis' definition, or where the entity being acquired fell outside the scope of what could be considered a portfolio company, e.g. the acquisition of a piece of land for a hotel. Including these transactions would have distorted the results and hence, they too were disregarded.

Finally, a number of transactions had to be excluded in light of other data insufficiencies relating to the other variables considered in the thesis. This could e.g. be cases where the company did not have data throughout the event period, where the actual acquisition year was diffuse, where ownership details were heavily construed, or where the author was unable to determine information relating to the other variables of interest. For the sake of accuracy, these transactions were also disregarded in line with the approach taken by similar theses (see e.g. Christensen and Andersen (2009)). In sum, once having imposed the restrictions above, the author was left with a sample of 83 relevant transactions. The individual removal categories can be seen in Figure 8.

Figure 8: Derivation of sample



Source: Own creation

6.1.2. Variable construction and data collection

Having identified the sample, a rigorous data collection process was conducted to ensure accurate data for the variables included in the regression models.

6.1.2.1. Dependent variable

The construction of the dependent variables has already been partly explained in prior sections so as to warrant the choice of statistical approach. As noted, the dependent variables used in the regression models relate to changes in operational performance. It was thus necessary to collect financial data for the companies identified as having been acquired in the sample construction process. The DVCA list does not list company identification numbers for the companies involved in a given transaction. Hence, the author manually linked each company subject to an acquisition with its respective CVR number. As per Vinten (2008) the author found the CVR number that related to the entity that 'survived' the given transaction, i.e. the company being acquired rather than a pre-transaction holding company or post-transaction holding company.

A small amount of research dedicated to private equity attempts to construct adjusted that reflects the post-transaction holding structure often seen in private equity transactions (see e.g. Freelink & Volosovych (2012)). This may be advantageous in regards to e.g. studying the debt financing characteristics of private equity transactions, since the debt raised to acquire a company is placed in the holding structure. However, such adjusted financials arguably have a number of drawbacks in studying operational performance. The most salient drawback relates to the fact that the holding structure-adjusted financials include balance sheet figures that may be "distorted" by goodwill increases incurred due to the transaction. In light of this thesis' reliance on balance sheet figures, it has been deemed appropriate to not base the analysis on such adjusted financials. As per Vinten (2008):

> "*Using total assets also might introduce a bias since firm goodwill valuations often changes dramatically post-buyout. Hence this will lead to larger total assets which all else equal infer a downward pressure on our operating performance ratios and therefore the impact from PE fund ownership will be underestimated.* […] *most of this potential asset boosting through changed goodwill depreciations takes place at the holding company level* […]" (Vinten, 2008, p. 41)

Having identified the relevant CVR numbers, financial data was extracted from Orbis and Valu8, using the built-in functions to extract consolidated financials when relevant. Financials were and cross-checked at random with actual annual reports accessed through the CVR registry to ensure accuracy. This approach is similar to those taken by Christensen and Andersen (2009) as well as Vinten (2008).

To construct the industry adjustments, each company's industry had to be identified. This was done using the CVR registry, which notes each CVR number's respective DB07 code. The DB07 code is a six digit code unique to Danish companies that indicate which industry the given CVR number operates within. Unfortunately, few databases, e.g. Orbis and Valu8, allow for searches based on the DB07 code, given the fact that the code is proprietary to Danish companies. Luckily, the first four digits of a given DB07 code are identical to the so-called NACE code, a pan-European system of identifying industries (CBS Library, 2020). NACE codes can either be two-digit, three-digit, or four-digit, with the latter being the most precise. Hence to ensure maximum industry comparability, the author identified each company's four-digit NACE code based on their respective DB07 code. Using these industry codes and CBS' historical Orbis database copies, the author was able to locate the companies that existed and were active within the event period being studied for each portfolio company. Doing so allowed an industry adjustment as per Section 5.1 to be created. This approach to data collection for industry adjustments is similar to that employed in a similar thesis studying Scandinavian private equity portfolio companies (see e.g. Müller & Hansen (2014)).

As a concrete example of the construction of the dependent variables using the data and approach mentioned above, one can e.g. consider the case of Union Engineering. Union Engineering was acquired by Capidea in 2010. The company saw e.g. raw changes in its ROA, EBIT and ROCE of approximately -6.7 and -14.9 percentage points from 2009 to 2012, respectively. Over the same period, the industry adjustments for control group (NACE code: 2829) were +3.7 and +8.0 percentage points for the same measures. Hence, ΔROA, EBIT for Union Engineering was approximately -6.7 – 3.7= -10.4 percentage points and ΔROCE was approximately -14.9 – 8.0 = -22.9 percentage points.

In light of the scope of the financials downloaded, no reformulations have been made. Likewise, while it is noted that a small number of companies have fiscal years that do match calendar years, it has not been deemed fitting to calenderize financials, in line with Christensen and Andersen (2009). This stems partly from the fact that any potential distortion would be negligible given that differences would relate to a matter of months and the fact that calenderization of stock variables such as balance sheet figures may not be fitting.

6.1.2.2. Independent variables

6.1.2.2.1. Transaction-level variables

Two of the hypotheses related to concrete actions taken by private equity companies in relation to the level of board representation and whether the CEO was changed. Hence, two variables were constructed to test these hypotheses. A binary variable was constructed indicating whether a CEO change took place,

taking a value of 1 if a change took place and 0 if not. A continuous variable was constructed indicating the proportion of private equity board members in a given portfolio company. No formalized databases existed for the construction of either variable and hence, the author had to consult the individual annual reports of the companies being acquired.

To assess whether the CEO had been changed, the author consulted the annual report of the given portfolio company from the fiscal year following the transaction and checked if the CEO was the same as the one listed in the final annual report published prior to the acquisition. In some situations, multiple names were listed as being part of the 'management' of the company and hence, it was difficult to assess which of the individuals truly represented the CEO. To overcome this, two steps were taken. Firstly, databases such as LinkedIn were consulted so as to see if it was possible who the "true" CEO was prior to the transaction. If this was possible, tracking changes was straightforward. If no such information existed, the author determined that CEO changes happened if any of the individuals listed in the management prior to the acquisition were not listed in the year following the transaction.

To assess the level of private equity board representation, the author again consulted the financial report published in the fiscal year following the transaction. The author then manually searched for each member of board on LinkedIn and the acquiring private equity company's websites to see if the member had a formal affiliation with the private equity company. If no results were found in this initial search, the author subsequently used other search engines. This was done to see if any other pieces of information could link the member to the private equity company via formal ties other than board membership in the given portfolio company, e.g. being noted as an external advisor to the given private equity company.

6.1.2.2.2. Private equity company-level variables

Two of the hypotheses related to the characteristics of the acquiring private equity company, namely whether they were domestic, i.e. headquartered in Denmark, or industry focused. To test these hypotheses, two binary variables were constructed, each taking the value of 1 if the acquirer was domestic or industry focused, respectively, and 0 if not.

Again, no formalized database existed for the construction of the variables. Yet, the data collection in relation to the factors relating to the acquiring private equity company was more straightforward. The author deduced whether the private equity company behind the given transaction was domestic by consulting the Preqin database and cross-checking with company websites. The Preqin database also served as the main point of departure in assessing whether the private equity company had a specific

industry focus or not. Preqin has proprietary descriptions on the majority of the private equity companies involved in the transactions considered in the sample. However, the full list of private equity companies was cross-checked against their individual websites to see if they mentioned specific focuses or not. This was done so as to ensure that Preqin data deficiencies did not impact the classification of private equity companies.

6.1.2.2.3. Portfolio company-level variables

The remaining hypotheses related to the prior ownership characteristics of the portfolio being acquired, namely if they had previously been family owned or previously been owned by another private equity company. Hence, a further set of binary variables were constructed, each taking the value of 1 if the portfolio was previously family owned or private equity owned, respectively, and 0 if not.

Neither piece of information is apparent from the DVCA list. Hence, the author manually categorized each transaction. Assessing prior private equity ownership was relatively straight forward. The aforementioned Zephyr database typically notes the vendor in a given private equity transaction. Hence, it was possible to deduce whether the vendor was a private equity company with relative ease by checking the database's description of said vendor[14]. Alas, as previously mentioned, not all transactions included in the sample are included in the Zephyr database. Likewise, in some transactions, the database does not have vendor descriptions. Hence, in some cases, the author had to manually ascertain who the prior owner was using other databases, including, but not limited to, Greens, Orbis, and Valu8, as well as assessing relevant press releases related to the transaction and the company's annual reports. In some cases, the prior owner of the given company involved in a transaction was a holding company. In these cases, the ownership structure was followed further to see who the final owner was.

Assessing whether a company was previously a family company was similar, but more intricate affair. Vinten (2008) takes a relatively broad approach to defining a family company, considering any company where the "[…] *CEO of a firm owns more than 5% of the ownership* […]" (Vinten, 2008, p. 46) as a family company. While this definition no doubt concurs with broader definitions of family companies, it is at odds with more formal definitions by e.g. European Family Business, which is what this thesis conforms to. As per Section 3, this thesis takes the approach that family companies are majority owned by the family in question, and that a member(s) of the family is represented in the board and holds the position of CEO.

[14] An example of Zephyr's vendor description of a private equity vendor can be seen in Appendix 2

Zephyr's aforementioned vendor descriptions gave some hints of prior family ownership in select cases. In some transactions, the database noted the vendor as a family or a single individual[15]. However, more often than not, the Zephyr database's vendor descriptions were inconclusive. Hence the true ownership of the company prior to the transaction was further assessed as in the case of secondary transactions via the aforementioned databases as well as consulting annual reports and press releases[16]. As in the case of assessing prior private equity ownership, some portfolio companies were previously owned by separate holding companies. In these situations, the holding structure was analyzed so as to see if a recurring surname existed amongst the owners of said holding companies and if said holding companies owned the majority of the given company involved in the transaction. Gathering data in regard to family board presence and CEO presence followed the approach noted in regard to these variables.

6.1.2.3. Control variables

Finally, in line with previous authors making use of OLS regression to conduct their analyses, it was deemed fitting to include a number of control variables so as to account for factors not relating to the ownership/governance characteristics being studied. Some authors have included e.g. industry and year dummy variables, to account for industry and time heterogeneity (e.g. Guo et al. (2011)). This thesis has already attempted to control for such factors using the industry adjustment innate in the dependent variable. Instead, the thesis employs a number of portfolio company specific financial control variables. The data for the construction of these variables stems from the financial data used to construct the dependent variables.

Company size is one of the most common, if not the most common, control variables employed in similar research. This stems from the notion that larger companies are able to reap the benefits of economies of scale, thereby improving their chances at seeing increases in profitability (Meuleman et al., 2009). Hence, the thesis also attempts to control for company size by including the size of the company as measured by total assets prior to the transaction.

A small number of prior authors have also noted the importance of controlling for prior levels of profitability. While this is not done by some authors, e.g. Bergström et al. (2007) and Martí et al. (2013), Hammer et al. (2018) note that companies who have experienced low pre-transaction profitability may be more likely to see increases in profitability post-transaction, ceteris paribus. Hence, inspired by the

[15] An example of Zephyr's vendor description of a family vendor can be seen in Appendix 2
[16] An example of determining family ownership via annual reports and press releases be seen in Appendix 3

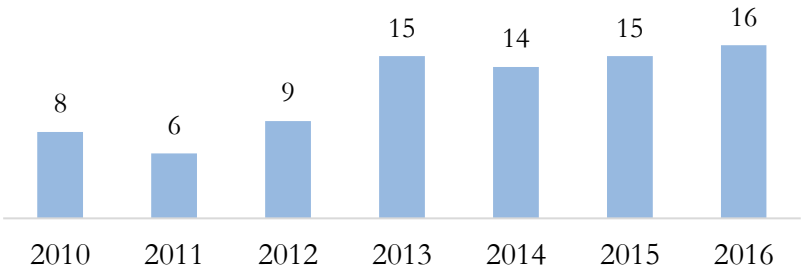
likes of Meuleman et al. (2009) and Guo et al. (2011) this thesis employs the prior level of ROA, NI based to control for the companies' respective profitability.

While one could include further variables to further control for potential exogenous effects, doing so would be at odds with the amount of independent variables that can be included in the model, as per the small sample size.

6.2. Sample description and summary statistics

Before proceeding with the regression analysis, it is fitting to introduce the collected data so as to gauge the characteristics of the transactions involved in the sample.

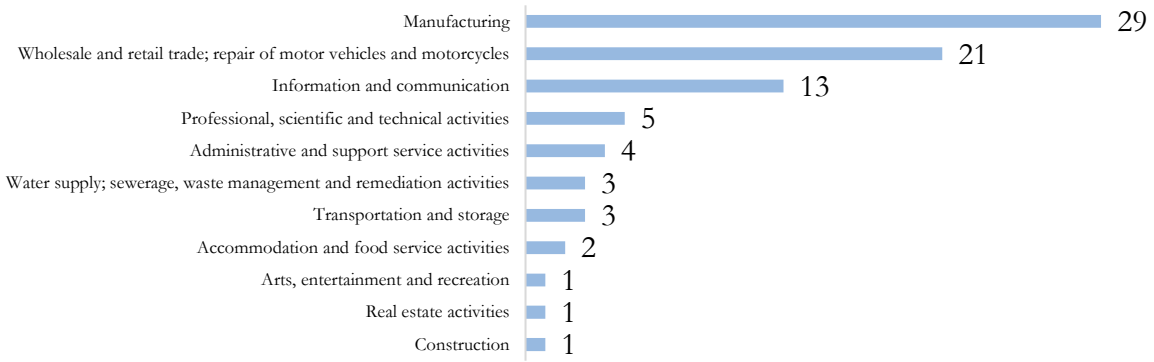
Figure 9: Transactions per year



Source: Own creation

Starting with an overall description of the transactions in a time perspective, one can deduce that that the majority of included transactions took place in the latter part of the time period in focus, from 2013 and onwards. The trend in the in the number of transactions per year fits with the overall trend in private equity activity noted previously in the thesis, i.e. that activity has been rebounding since 2010.

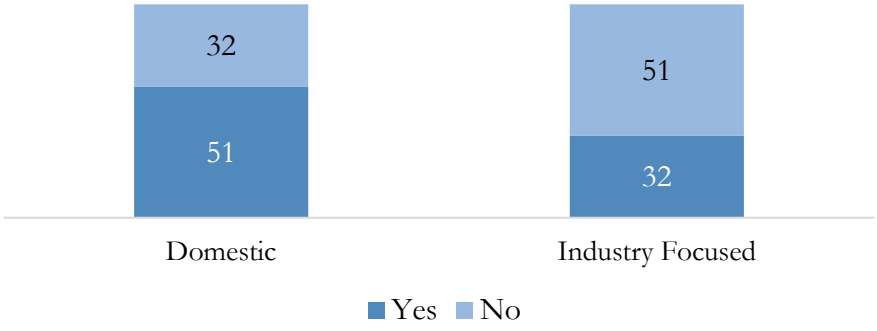
Figure 10: Transactions by major industry grouping



Source: Own creation

Figure 10 depicts the transactions in accordance with major industry groupings that the NACE system uses. It is apparent that the majority of transactions took place within the manufacturing and wholesale industries.

Figure 11: Characteristics of acquiring private equity companies, by transaction

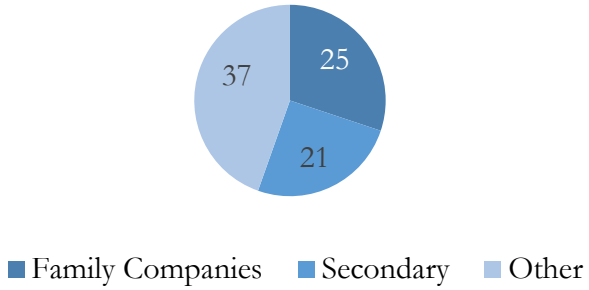


Source: Own creation

In regard to characteristics of the acquiring private equity companies, it is apparent that the majority of the transactions in the sample were made by domestic acquirers. That being said, it is clear that Danish private equity is no longer merely a domestic industry with approximately 40% of the transactions having been conducted by foreign private equity companies. This proportion seems to fit well with the observation that a third of recent European private equity transactions could be classified as cross-border (Cornelius, 2011).

On the flip side, the majority of the acquiring private equity companies do not appear be industry focused, with the majority of the transactions having been made by 'generalist' acquirers. The fact that the majority of acquirers are generalists is in interesting in the face of the sample used by Cressy et al. (2007), in which the majority of acquirers were noted as having industry specializations. The disparity between the sample at hand and that employed by Cressy et al. (2007) may be rooted in geographical differences. The authors study U.K. private equity transactions rather than Danish or Scandinavian transactions, and the U.K. has a longer history of private equity activity. This longer history may have resulted in the development of greater industry focus amongst a more mature set of local private equity companies (Cendrowski et al., 2012).

Figure 12: Characteristics of private equity portfolio companies' prior ownership

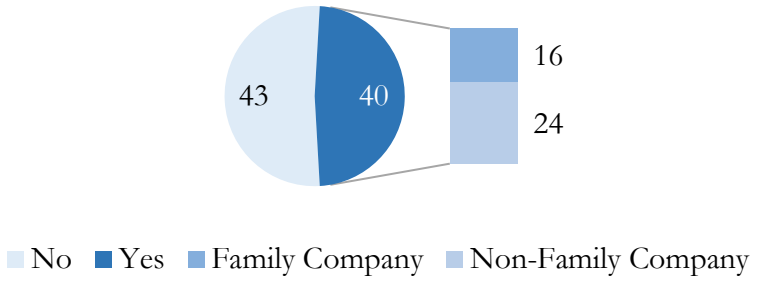


Source: Own creation

Looking at the characteristics of the acquired companies it is apparent that approximately a third of the companies could be classified as previously having been family owned in accordance with the definition adopted in this thesis. This number may seem slightly low in light of the previously noted statistics indicating that family companies represent over half of private, non-financial businesses in Denmark. Yet it is important to remember two factors. Firstly, the definition employed in the data collection process is arguably on the strict side, requiring a given family to not only be the majority owners, but also have presence on the board and management. This may have removed some companies with 'weaker' prior family involvement, yet was deemed fitting to ensure that only 'real' family companies were characterized as such given the data constraints. Secondly, as noted by Bennedsen and Nielsen (2014), the proportion of companies that can be characterized as family companies declines with size. In other words, family companies are more prevalent amongst smaller companies. Given that private equity portfolio companies are typically larger companies (Cendrowski et al., 2012), this may be a further reason for the lower proportion of family companies seen in the sample. Finally, it should be noted that e.g. Vinten (2008) only noted 15 family companies in his sample of 73 Danish private equity transactions.

Family companies aside, one can deduce that a slightly smaller proportion of the transactions were so-called secondary transactions. The relative proportion of secondary transactions concurs with the proportion of secondary transactions that have been observed in recent waves of private equity (Kaplan & Strömberg, 2009). The remaining transactions relate to companies with other prior ownership characteristics. While the focus of this thesis is not to meticulously create a granular mapping of private equity portfolio companies' prior ownership traits, it is relevant to briefly explain what such 'other' ownership types were. It became apparent that a number of transactions related to companies that were previously owned by multiple founders or members of the management. Likewise, some companies were previously publicly listed and were taken private by the acquiring private equity company.

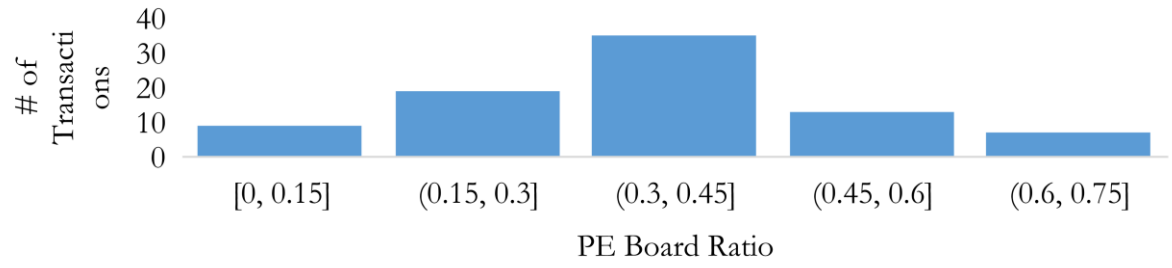
Figure 13: CEO changes in private equity portfolio companies



Source: Own creation

Looking at Figure 13 it is apparent that the approximately half of portfolio companies saw their pre-transaction CEO being changed following the transaction. Guo et al. (2011) note that approximately 40% of the portfolio companies in their sample saw CEO changes, and hence the observed proportion seems plausible. It is interesting to note that the split between CEO changes in family companies and non-family companies is relatively equal. As noted, 25 companies with prior family involvement were identified in the sample, and as per Figure 13, 16 saw CEO changes. This indicates that a majority of family companies saw their family CEO being changed.

Figure 14: PE board ratio in private equity portfolio companies



Source: Own creation

As is apparent from Figure 14, the majority of private equity portfolio companies saw a noticeable degree of participation in their boards by their new owners. This in line with observations by Guo et al. (2011), whose sample companies had an average private equity board ratio of approximately 0.5, i.e. with 50% percent of board members being formally affiliated with the acquiring private equity company. Figure 14 corroborates the notion that the private equity partners are active in the formal governance mechanisms in their portfolio companies.

Table 2 presents the summary statistics for the variables included in the regression models. The characteristics of the independent variables relating to the ownership/governance factors have already been described above. The focus of this thesis, as previously mentioned, is not to explore the performance changes of private equity portfolio companies as a whole, but rather what impacts these changes. Hence, no extensive analysis will be done of the overall changes in performance implied by the medians of the dependent variables. That being said, it is worth commenting briefly on the developments.

Table 2: Summary statistics

Table 2 presents summary statistics for the variables included in the regression analysis. Definitions of the variables are as per preceding sections and winsorization has been conducted as per Section 5.2.

	Median	St. Dev	N
Dependent Variables			
ΔROA, NI	-.069	.142	83
ΔROA, EBIT	-.080	.169	83
ΔROCE	-.157	.418	83
Independent Variables			
Family Company	0	.462	83
Secondary	0	.437	83
Domestic	1	.490	83
Industry Focus	0	.490	83
PE Board Ratio	.333	.173	83
CEO Change	0	.503	83
Control Variables			
Prior profitability	.146	.163	83
Prior size[a]	11.712	1.213	83

[a] Natural logarithm applied to asset size in 1,000 DKK

As one can see, the companies included in the sample experienced changes in ROA that are negative both when using net income and EBIT as the numerator. This is contrary to the older research on private equity owned companies, which finds increases in the measure (Kaplan, 1989). However, the results are similar to newer findings by e.g. Vinten (2008) and Hammer et al. (2018) who observe declines in ROA. The magnitude of the changes is in line with those found by Vinten (2008), but slightly larger than those found by other authors, such as Hammer et al. (2018) and Guo et al. (2011). Yet it is important to keep in mind that e.g. Hammer et al. (2018) considers a t-1 to t+3 period relative to this study's t-1 to t+2 approach. This may impact comparability.

Looking at ΔROCE, the companies saw much higher drops in performance. The fact that the companies saw drops in performance is again in line with findings found by Vinten (2008) and also concurs with findings by and Meuleman and others (2009). However, the magnitude of the drops in performance is larger than that observed by these authors. Yet, it is important to consider two factors in regard to the magnitude of ΔROCE. Firstly, Meulemann et al. (2009) consider a t-0 to t+3 and hence, their findings are not directly comparable as their capital employed measures do not reflect changes from pre-transaction levels. Similarly, Vinten (2008), who finds a drop in ROCE with magnitude similar to ROA, defines capital employed in a curious way. Rather than the standard approach of subtracting current liabilities from total assets, as per Meuleman et al. (2009), Vinten (2008) appears to define capital employed as equity plus the sum of current and non-current liabilities, sans provisions.

6.3. Regression results

With an understanding of the data used in the regression models, one can now proceed to presenting the actual results. The results of the regressions are presented in Table 3-5. Table 3 and 4 present iterations of the regression model using variations of ΔROA as the dependent variable, whereas Table 5 presents iterations of the model using ΔROCE as the dependent variable. The tables are presented in horizontal orientation to ensure legibility.

In each table, Model 1-6 present regression results for iterations of the model where the ownership/governance factors are included in isolation, i.e. one at a time. This is done so as to ensure transparency in the reporting of the results, in line with Scellato and Ughetto (2013). Model 7 presents an iteration of the regression results where all the ownership/governance factors are included. Model 8 builds on Model 7, but further includes an interaction term between the variable indicating prior family ownership and change in CEO, so as to test Hypothesis 7a and 7b. In all models, the noted control variables have been included and all other econometric specifications are as per Section 5.2. The control variables are not presented in the results as no interpretation will be given to them, nor are intercepts given the same reasoning[17]. This approach is in line with that taken by Hammer et al. (2018).

In keeping with the exploratory use of regression in this thesis and the hypotheses at hand, the main focus of the interpretation of the results will be the sign of the variables' coefficients, as opposed to the actual value of the coefficients. Variables that have significant coefficients within the accepted bounds are highlighted in blue so as to ease identification for the reader.

[17] Extended regression tables depicting the intercept and control variables can be seen in Appendix 4.

Table 3: Regression results, ΔROA, NI-based

Table 3 presents the OLS regression results for post-transaction changes in operational performance, as measured by the industry adjusted change in return on assets (ΔROA, NI) from the year prior to the transaction till two years following the transaction, in relation to select ownership/governance factors. The coefficients of the variables indicate percentage point changes, i.e. with 0.103 indicating 10.3 percentage point increase. All models are have *F*-statistics that are significant at the 0.05 level. Definitions of the independent and the included control variables are as per the preceding sections and all other econometric specifications follow Section 5.2.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Family Company	-0.018						-0.032	-0.037
	(0.029)						(0.030)	(0.032)
Secondary		-0.029					-0.033	-0.033
		(0.029)					(0.031)	(0.032)
Domestic			0.053*				0.051*	0.052*
			(0.028)				(0.028)	(0.028)
Industry Focus				-0.007			0.002	0.003
				(0.028)			(0.026)	(0.025)
PE Board Ratio					0.003		-0.018	-0.019
					(0.058)		(0.063)	(0.064)
CEO Change						0.009	0.007	0.005
						(0.025)	(0.025)	(0.029)
Fam*CEO Change								0.007
								(0.050)
Obs.	83	83	83	83	83	83	83	83
R-squared	0.415	0.418	0.432	0.412	0.412	0.413	0.445	0.445
Company Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
F-statistic	19.111	17.764	25.686	18.160	18.470	18.395	10.130	9.032

Huber-White heteroscedasticity robust standard errors are noted in in parentheses
****, **, *, and † indicate significance at 0.01, 0.05, 0.10, and 0.15 levels, respectively*

Table 4: Regression results, ΔROA, EBIT-based

Table 4 presents the OLS regression results for post-transaction changes in operational performance, as measured by the industry adjusted change in return on assets (ΔROA, EBIT) from the year prior to the transaction till two years following the transaction, in relation to select ownership/governance factors. The coefficients of the variables indicate percentage point changes, i.e. with 0.103 indicating 10.3 percentage point increase. All models are have *F*-statistics that are significant at the 0.05 level. Definitions of the independent and the included control variables are as per the preceding sections and all other econometric specifications follow Section 5.2.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Family Company	-0.016						-0.027	-0.056
	(0.032)						(0.035)	(0.039)
Secondary		-0.026					-0.030	-0.033
		(0.034)					(0.036)	(0.036)
Domestic			0.040				0.040	0.041
			(0.033)				(0.034)	(0.034)
Industry Focus				-0.014			-0.005	-0.000
				(0.033)			(0.033)	(0.031)
PE Board Ratio					-0.026		-0.040	-0.041
					(0.066)		(0.072)	(0.070)
CEO Change						-0.002	-0.003	-0.018
						(0.028)	(0.028)	(0.033)
Fam*CEO Change								0.050
								(0.055)
Obs.	83	83	83	83	83	83	83	83
R-squared	0.464	0.466	0.470	0.464	0.463	0.462	0.479	0.484
Company Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
F-statistic	33.364	32.278	37.261	32.243	33.124	32.588	13.593	12.870

Huber-White heteroscedasticity robust standard errors are noted in in parentheses
****, **, *, and † indicate significance at 0.01, 0.05, 0.10, and 0.15 levels, respectively*

Table 5: Regression results, ΔROCE

Table 5 presents the OLS regression results for post-transaction changes in operational performance, as measured by the industry adjusted change in return on capital employed (ΔROCE) from the year prior to the transaction till two years following the transaction, in relation to select ownership/governance factors. The coefficients of the variables indicate percentage point changes, i.e. with 0.103 indicating 10.3 percentage point increase. All models are have *F*-statistics that are significant at the 0.05 level. Definitions of the independent and the included control variables are as per the preceding sections and all other econometric specifications follow Section 5.2.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Family Company	0.098						0.071	0.014
	(0.097)						(0.102)	(0.108)
Secondary		-0.117					-0.089	-0.094
		(0.091)					(0.104)	(0.105)
Domestic			0.046				-0.013	-0.009
			(0.104)				(0.107)	(0.106)
Industry Focus				-0.052			-0.052	-0.042
				(0.090)			(0.086)	(0.082)
PE Board Ratio					0.379*		0.391*	0.389*
					(0.216)		(0.222)	(0.222)
CEO Change						0.020	-0.007	-0.037
						(0.087)	(0.086)	(0.107)
Fam*CEO Change								0.099
								(0.155)
Obs.	83	83	83	83	83	83	83	83
R-squared	0.178	0.180	0.169	0.170	0.190	0.168	0.210	0.213
Company Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
F-statistic	6.075	6.395	6.389	6.052	8.687	6.012	3.947	3.591

Huber-White heteroscedasticity robust standard errors are noted in in parentheses
****, **, *, and † indicate significance at 0.01, 0.05, 0.10, and 0.15 levels, respectively*

6.4. Interpretation and discussion of regression results

6.4.1. Private equity company characteristics

As is apparent from the Table 3, one of the apparent findings is that domestic ownership appears to have a positive impact on operational performance changes. In all regressions based on ΔROA, NI the variable indicating domestic private equity ownership sees statistical significance and has a positive coefficient. In other words, private equity portfolio companies owned by domestic private equity companies appear to have seen superior operational performance changes. This is in line with the findings that cultural distance and physical distance detract from a private equity company's ability to actively engage with portfolio companies, as noted by Scellato and Ughetto (2013) as well as Hammer et al. (2018).

While the findings relating to domestic ownership appear to confirm Hypothesis 3, there are a number of considerations one should take in regard to interpreting the result. Firstly, the significance in the models based on ΔROA, NI is not echoed in the models based on ΔROA, EBIT. As one can see, the sign of the coefficient in the EBIT-based models is the same, yet no statistical significance solidifies the result in these models. Additionally, the sign of the variable indicating domestic ownership sees some fluctuation in the ΔROCE-based models. Given the lack of significance for the variable in these models, these fluctuations should be interpreted with caution, yet are nonetheless important to point out.

Another factor worth considering in regard to the findings relating to domestic ownership relate to the construction of the variable. In constructing the variable, all private equity acquirers that were headquartered outside of Denmark were listed as foreign. It may be the case that some private equity companies actually have local presence in Denmark through local offices and teams. The variable does not account for this given the difficulty of tracing when private equity companies may have opened such offices. Secondly, the degree of foreignness is not reflected in the variable. One might expect a Swedish private equity company to be reminiscent in culture to a Danish private equity company, whereas an American private equity company might differ. Nevertheless, the finding regarding domestic ownership is interesting and appears to support Hypothesis 3.

The variable indicating if a company was acquired by an industry focused private equity company has fluctuating coefficients across the models. Yet, it does not show any statistical significance in any iteration of the models. This is surprising given the findings of e.g. Cressy et al. (2007) who found strong support for the notion that industry specialization could help private equity companies exploit the private equity toolbox in a more focused way.

One might interpret the lacking statistical significance in the sense that industry focus does not lead to any advantages, and thus discard Hypothesis 4. However, it is important to note that lacking levels of statistical significance do not necessarily mean that one can accept the null-hypothesis that the variable has a coefficient of zero. Lacking statistical significance may also indicate that in the sample and specification at hand, there is no statistical evidence that the null-hypothesis can be rejected. This limits the inferences that can be made in regard to the variable, and thus the ability to assess Hypothesis 4. As in the case of the variable related to domestic ownership, one also needs to critically assess the construction of the variable. The author relied on self-reported notions of industry focus and information from databases such as Preqin to assess if a private equity company was industry focused. A private equity company may present itself as being focused, but in reality not be. Hence, such variable misspecification may also have led to lacking statistical significance.

6.4.2. Private equity portfolio company characteristics

The coefficient for the variable indicating prior private equity ownership is negative across all models, i.e. the same direction as was hypothesized in Hypothesis 5. However, there are no iterations of the regression models in which these coefficients see any statistical significance. This is surprising. As noted in the literature review, secondary transactions should see inferior operational performance changes given the fact that the first private equity acquirer should already have reaped the potential of the private equity toolbox in the first holding period.

However, as noted, authors such as Achleitner and Figge (2014) found similar statistically ambiguous results in relation to secondary transactions. One can speculate as to what these statistically ambiguous results are founded in. As noted in regards to industry focus, it may simply be due to the fact that the sample at hand does not reveal statistical significance and that significance may be found in other samples. However, the lack of significance may also be due to the fact that secondary transactions actually do not have less potential for value creation than primary transactions. As noted by Achleitner and Figge (2014, p. 423):

> "*Overall, our findings on the operational performance of financial buyouts suggest that they still offer potential for operational performance improvements similar to other buyout types* […]" (Achleitner & Figge, 2014, p. 423)

The results relating to the variable indicating prior family ownership require slightly more interpretation, given the fact that several models include interaction terms with the variable indicating CEO change. In the models in which the variable was tested in isolation sans interaction terms, no statistically significant results were identified. The coefficient for the variable is negative in the ΔROA based models, in line

with Hypothesis 6, yet the coefficient is positive in the ΔROCE based models. These mixed signs are confusing. Yet, as stressed, no coefficients are statistically significant and hence further interpretation is limited, as with the other variables lacking statistical significance. While the results may indicate that prior family ownership does not impact post-transaction operational performance, the results may also be due to variable misspecification. One can ponder as to whether the adopted definition truly captured family companies.

Nevertheless, while the variable indicating prior family ownership lacks statistical significance in the models sans interaction terms, it is worth mentioning the statistical results relating to the variable in the models using interaction terms. As can be seen in the models based on ΔROA, NI and ΔROA, EBIT, the variable has a negative coefficient when the interaction term is included. While neither model produces evidence of statistical significance within the accepted significance levels, the variable achieves a p-value of 0.156 in the ΔROA, EBIT based model. It is undoubtedly unorthodox to comment on such a result. However, given the proximity to the accepted significance levels, and sparse findings relating to the role of prior family involvement, some commentary will be given nonetheless. Further to the caution that should be taken given the lack of conventional significance, in models including the interaction term, the coefficient of the family company variable indicates the effect of having previously been a family company on changes in operational performance, contingent on no CEO change taking place. Hence, the negative coefficient of the family ownership variable indicates the that prior family ownership leads to inferior changes in operational performance, contingent on no CEO replacement taking place in the post-transaction period. This finding appears to lend some very weak support for Hypothesis 7a.

6.4.3. Post-transaction governance mechanisms

Looking at the post-transaction governance mechanisms hypothesized to impact operational performance, the coefficient variable relating to CEO changes sees disparate signs, ranging from positive to negative, and a lack of significance throughout the models. This is in stark contrast with the statistically significant findings by e.g. Guo et al. (2011, p. 500), who "[…] *find that the management change variable is positively related to cash flow performance.*" As in the interpretation of the other statistically insignificant results, the lack of statistical significance and noise in regard to the sign of coefficients may either be due to an actual lack of statistical relation in real life, or due to the sample at hand. Nevertheless, the results undermine the ability to comment concretely on Hypothesis 1.

In regard to proportion of private equity board members, one can deduce a general lack of statistical significance in the ΔROA based models, yet some statistically significant results in the ΔROCE based models, as per Table 5. The coefficient of the variable implies that increased board presence by private

equity board members leads to superior operational performance changes, hence lending support to Hypothesis 2.

In assessing this support, it is worth noting that the construction of the variable relating to this board presence was superbly difficult. While searches via LinkedIn and company websites gave some indication of whether board members were affiliated with the given private equity acquirer or not, it may very well be that some members of the board were external parties appointed by the private equity company and that such relationships were missed. This may have led to a distorted data collection process. Hence, some caution should be taken when making inferences based on the results.

6.5. Alternative specifications and robustness checks

Naturally, so as to ensure the robustness of the abovementioned results, a number of checks can be made[18]. Three alternative specifications of the abovementioned models have been tested. For the sake of brevity, only the models in which all independent variables are included and models where the interaction term is included are presented in the following. In each subsequent regression table, Model 1 and 2 depict regression results using ΔROA, NI, Model 3 and 4 depict regression results using ΔROA, EBIT, and Model 5 and 6 depict regression results using ΔROCE. As per the original regression results presented in Section 6.3., the values taken by the control variables and constant are not depicted, given that they will not be used in interpretation[19].

[18] For the sake of brevity, summary statistics for these regressions are not presented here, but can be found in Appendix 5 alongside summary statistics for other variables.
[19] Extended regression tables can be seen in Appendix 5

Table 6: Robustness test, no profitability control

Table 6 presents the OLS regression results for industry adjusted post-transaction changes in operational performance, from the year prior to the year of transaction till two years following the transaction, in relation to select ownership/governance factors. The coefficients of the variables indicate percentage point changes, i.e. with 0.103 indicating 10.3 percentage point increase. All models are have *F*-statistics that are significant at the 0.05 level. Model 1 and 2 depict regression results using ΔROA, NI, Model 3 and 4 depict regression results using ΔROA, EBIT, and Model 5 and 6 depict regression results using ΔROCE. All other econometric specifications are as per Section 5.2. No prior profitability control has been used.

	(1) ΔROA, NI	(2) ΔROA, NI	(3) ΔROA, EBIT	(4) ΔROA, EBIT	(5) ΔROCE	(6) ΔROCE
Family Company	-0.022	-0.037	-0.014	-0.057	0.088	0.013
	(0.034)	(0.043)	(0.041)	(0.051)	(0.105)	(0.110)
Secondary	-0.015	-0.016	-0.008	-0.012	-0.058	-0.066
	(0.035)	(0.035)	(0.041)	(0.040)	(0.110)	(0.110)
Domestic	0.125***	0.125***	0.133***	0.134***	0.112	0.114
	(0.031)	(0.031)	(0.038)	(0.037)	(0.096)	(0.095)
Industry Focus	-0.012	-0.009	-0.023	-0.015	-0.076	-0.062
	(0.030)	(0.028)	(0.038)	(0.035)	(0.092)	(0.087)
PE Board Ratio	-0.043	-0.044	-0.071	-0.073	0.349†	0.347
	(0.085)	(0.085)	(0.096)	(0.096)	(0.238)	(0.239)
CEO Change	0.003	-0.004	-0.008	-0.030	-0.013	-0.052
	(0.029)	(0.034)	(0.034)	(0.040)	(0.090)	(0.112)
Fam*CEO Change		0.026		0.073		0.130
		(0.055)		(0.064)		(0.162)
Obs.	83	83	83	83	83	83
R-squared	0.255	0.257	0.262	0.271	0.147	0.151
Company Controls	Yes	Yes	Yes	Yes	Yes	Yes
F-statistic	5.444	5.166	5.825	5.859	2.143	2.074

Huber-White heteroscedasticity robust standard errors are noted in in parentheses
****, **, *, and † indicate significance at 0.01, 0.05, 0.10, and 0.15 levels, respectively*

While the author finds it reprehensible that some prior authors and theses (see e.g. Bergström et al. (2007)) do not control for prior profitability, it is apparent that some authors do not see the importance. Hence, to test whether the inclusion of prior profitability is justified, and if it impacts the regression results, a robustness test is run using only prior size as a control variable. As seen above, the findings relating to domestic ownership are echoed in a majority of the models at strong levels of statistical significance. The variable relating to private equity board involvement does not see significance within conventional bounds in the ΔROCE based models, as was the case in the original specifications. However, the variable is still significant at a 15% level and the coefficient is again positive and similar in

magnitude. The findings relating to prior family involvement are echoed only in the coefficient of the variable, but not in its significance, further underlining the caution that should be taken in regard to the aforementioned commentary.

Table 7: Robustness test, alternative adjustment

Table 7 presents the OLS regression results for post-transaction changes in operational performance, from the year prior to the year of transaction till two years following the transaction, in relation to select ownership/governance factors. The coefficients of the variables indicate percentage point changes, i.e. with 0.103 indicating 10.3 percentage point increase. All models are have *F*-statistics that are significant at the 0.05 level. Model 1 and 2 depict regression results using ΔROA, NI, Model 3 and 4 depict regression results using ΔROA, EBIT, and Model 5 and 6 depict regression results using ΔROCE. All other econometric specifications are as per Section 5.2. Dependent variables are adjusted using proprietary control groups rather than industry-adjusted.

	(1) ΔROA, NI	(2) ΔROA, NI	(3) ΔROA, EBIT	(4) ΔROA, EBIT	(5) ΔROCE	(6) ΔROCE
Family Company	-0.020	0.001	-0.030	-0.058	0.065	-0.055
	(0.032)	(0.036)	(0.036)	(0.041)	(0.141)	(0.180)
Secondary	-0.018	-0.015	-0.009	-0.012	-0.022	-0.035
	(0.034)	(0.035)	(0.036)	(0.036)	(0.130)	(0.131)
Domestic	0.057*	0.055*	0.027	0.028	-0.095	-0.088
	(0.029)	(0.029)	(0.031)	(0.030)	(0.157)	(0.152)
Industry Focus	-0.026	-0.030	-0.028	-0.023	-0.120	-0.099
	(0.028)	(0.027)	(0.034)	(0.032)	(0.115)	(0.105)
PE Board Ratio	0.044	0.045	-0.018	-0.019	0.613**	0.608**
	(0.066)	(0.067)	(0.068)	(0.068)	(0.294)	(0.290)
CEO Change	0.015	0.027	0.006	-0.008	0.029	-0.034
	(0.027)	(0.032)	(0.029)	(0.033)	(0.118)	(0.136)
Fam*CEO Change		-0.038		0.048		0.208
		(0.054)		(0.059)		(0.221)
Obs.	83	83	83	83	83	83
R-squared	0.462	0.465	0.503	0.507	0.187	0.194
Company Controls	Yes	Yes	Yes	Yes	Yes	Yes
F-statistic	12.924	10.776	14.299	13.442	3.248	2.948

Huber-White heteroscedasticity robust standard errors are noted in in parentheses
****, **, *, and † indicate significance at 0.01, 0.05, 0.10, and 0.15 levels, respectively*

As noted, the regressions thus far have used dependent variables that have been industry adjusted as per Section 5.1. Another method of adjusting seen in similar studies, e.g. by Vinten (2008) and Bergström et al. (2007) is by attempting to create a more select control group to be used in the adjustments of changes in operational performance. Vinten (2008) creates a proprietary control group for each portfolio company that includes companies similar to the given portfolio company in terms of pre-transaction size. The

author of this thesis has not followed this approach thus far. This reason for this stems from the belief that the selection of such proprietary control companies, rather than using industry-wide control groups, could be hypothesized to result in some degree of selection bias. Nevertheless, having extracted data from CBS' historical Orbis databases on the companies within the portfolio companies' respective industries, it was possible to create such control groups. Hence, inspired by Vinten (2008), the author created a proprietary control group for each portfolio company that included the four companies within the same industry that were most similar in size of assets prior to the transaction. The author focused on finding two control companies that were smaller than the portfolio company and two that were larger. In some cases, this was not possible, and therefore some portfolio companies only saw control companies that were smaller than itself. To exemplify this approach, one can again use the case of Union Engineering. Whereas the adjustments to the company's change in ROA, EBIT and ROCE were +3.7 and +8.0 percentage points respectively using the industry adjustments, the control group adjustments were +3.4 and +4.1 percentage points. Looking at Table 7, which depicts the regressions using the proprietary control group adjustments rather than industry adjustments, one can deduce a solidification of the original results with respect to the findings related to domestic ownership and board involvement. However, the effect relating to family ownership is again not solidified.

Table 8: Robustness test, no winsorization

Table 8 presents the OLS regression results for industry adjusted post-transaction changes in operational performance, from the year prior to the year of transaction till two years following the transaction, in relation to select ownership/governance factors. The coefficients of the variables indicate percentage point changes, i.e. with 0.103 indicating 10.3 percentage point increase. All models are have *F*-statistics that are significant at the 0.05 level, except models 5 and 6. Model 1 and 2 depict regression results using ΔROA, NI, Model 3 and 4 depict regression results using ΔROA, EBIT, and Model 5 and 6 depict regression results using ΔROCE. No winsorization conducted. All other econometric specifications are as per Section 5.2.

	(1) ΔROA, NI	(2) ΔROA, NI	(3) ΔROA, EBIT	(4) ΔROA, EBIT	(5) ΔROCE	(6) ΔROCE
Family Company	-0.059†	-0.053	-0.052	-0.068†	0.234	-0.035
	(0.038)	(0.037)	(0.040)	(0.045)	(0.186)	(0.229)
Secondary	-0.042	-0.041	-0.030	-0.032	-0.420	-0.449
	(0.034)	(0.035)	(0.040)	(0.041)	(0.410)	(0.431)
Domestic	0.042	0.042	0.031	0.032	0.040	0.058
	(0.029)	(0.030)	(0.036)	(0.036)	(0.362)	(0.371)
Industry Focus	0.003	0.002	0.000	0.003	-0.133	-0.085
	(0.027)	(0.025)	(0.033)	(0.031)	(0.186)	(0.160)
PE Board Ratio	-0.060	-0.060	-0.084	-0.084	0.263	0.256
	(0.078)	(0.079)	(0.085)	(0.085)	(0.682)	(0.679)
CEO Change	0.009	0.012	0.001	-0.008	-0.245	-0.389
	(0.028)	(0.032)	(0.032)	(0.037)	(0.285)	(0.399)
Fam*CEO Change		-0.011		0.029		0.470
		(0.059)		(0.062)		(0.415)
Obs.	83	83	83	83	83	83
R-squared	0.568	0.568	0.639	0.640	0.243	0.251
Company Controls	Yes	Yes	Yes	Yes	Yes	Yes
F-statistic	10.333	8.931	11.314	10.179	1.641	1.529

Huber-White heteroscedasticity robust standard errors are noted in in parentheses
****, **, *, and † indicate significance at 0.01, 0.05, 0.10, and 0.15 levels, respectively*

The last robustness check relates to the level of winsorization employed. As noted in Section 5.2, the preceding models have used winsorization at the 5th percentile for relevant variables, so as to combat the effects of outliers in small samples. This approach is identical to that taken by previous authors, such as Svanberg and Wanzelius (2013). To test if the approach impacts the results, one can run the regressions using unwinsorized variables. In using unwinsorized variables, the findings related to domestic ownership are echoed in the coefficients across models, yet lack statistical significance within the accepted bounds. Nevertheless, it should be noted that the exact p-value for e.g. the coefficient of the variable in Model 1 is 0.156. The findings regarding the involvement of private equity board members is echoed in the sign

of the coefficient in the ΔROCE-based model, but also lacks significance. Surprisingly, while lacking acceptable statistical significance in the original results, the findings related to the family variable in the ΔROA, EBIT based models are strengthened, with the variable now being significant at a 15% level. While these results appear to detract from the original findings, models employing no winsorization should be interpreted with a high degree of caution, given the fact that a noticeable number of outliers that were observed in the dataset, which may have impacted estimates.

It should be noted that the author has also tried running the regressions using no profitability control and the alternative adjustment with unwinsorized variables. The results of these regressions are included in Appendix 5 for sake of brevity. In these regressions, further support for the amicable effects of domestic ownership are found, yet the findings relating to high levels of board representation are not corroborated.

In sum, the results of the original regressions presented in Section 6.3. seem to show varying levels of robustness. The most robust result seems to be the impact of domestic ownership. The results relating to private equity board involvement see increased corroboration in some robustness tests and decreased corroboration in others. The results relating to previously family owned companies, that do not see CEO changes, see little corroboration, and hence, further doubt is cast on the commentary given previously. Inevitably, one could have conducted an array of other tests to ensure the robustness of the results, e.g. alternative event periods or the inclusion of other control variables. Yet, due to data and scope constraints, the tests noted above were deemed the most salient.

6.6. Sub-conclusion

The lacking statistical significance noted in relation to many of the variables of interest is no doubt disappointing from the perspective that only such results can be fully interpreted in regard to the hypotheses posed. However, it should be noted that regressions employing small sample sizes typically see less statistically significant variables than larger samples, ceteris paribus (Combs, 2010). Even so, the statistically significant results seen in studies with larger sample sizes may not be due to actual effects but e.g. measurement error. As noted by Combs (2010, p. 11):

> "*Effects deflated by measurement error are less likely to be significant and therefore published unless a sample is large and offers enough statistical power to make poorly measured relationships significant*." (Combs, 2010, p. 11):

Nevertheless, a number of inferences were able to be made based on the results presented. A summary of the results in relation to the hypotheses previously posed is seen in Table 9 below. The table recounts

the hypotheses and presents the expected sign of the variables' coefficient. Based on the original regression analyses presented in Section 6.3, the most common sign for the given variable is noted, and any inferences based on statistical significance are noted. Furthermore, given the findings from the robustness test, the author has assessed the level of robustness for the inferences noted.

Table 9: Regression results summary

Hypotheses	Exp. Sign	Obs. Sign	Inferences based on regressions from Section 6.3	Robust
Hypothesis #1: Private equity portfolio companies that experience CEO changes following the transaction see superior post-transaction operational performance changes.	+	+/-	N/A	N/A
Hypothesis #2: Private equity portfolio companies that see high levels of representation by private equity board members see superior post-transaction operational performance changes.	+	+/-	Positive coefficient significant in ΔROCE-based models.	(Yes)
Hypothesis #3: Private equity portfolio companies that are acquired by domestic private equity companies see superior post-transaction operational performance changes.	+	+	Positive coefficient significant in ΔROA, NI-based models.	Yes
Hypothesis #4: Private equity portfolio companies that are acquired by industry focused private equity companies see superior post-transaction operational performance changes.	+	-	N/A	N/A
Hypothesis #5: Private equity portfolio companies that have previously been owned by private equity companies see inferior post-transaction operational performance changes.	-	-	N/A	N/A
Hypothesis #6: Private equity portfolio companies that can be categorized as having previously been family companies see inferior post-transaction operational performance changes.	-	+/-	N/A	N/A
Hypothesis #7a: Private equity portfolio companies that can be categorized as having previously been family companies, that do not experience CEO changes, see inferior post-transaction operational performance changes.	-	-	(Negative coefficient shows weak significance slightly outside accepted significance levels in ΔROA, EBIT-based models)	(No)
Hypothesis #7b: Private equity portfolio companies that can be categorized as having previously been family companies, that do experience CEO changes, see superior post-transaction operational performance changes.	+	+	N/A	N/A

7. Limitations and assessment of empirical analysis

Inevitably one must subject the findings from the empirical analysis to some degree of scrutiny. The discussion and interpretation of the results has already hinted at some deficiencies of the results as per the robustness tests and commentary on select variable construction. However, one can further systematically assess the results in the face of the three criteria typically considered in regard to deductive research, namely validity, reliability, and objectivity. (Thiétart, 2001)

In regard to objectivity, the author has not been influenced by any third parties in either the data collection or the analysis. The author has seen his role in light of the positivist paradigm that influences the research as someone who can observe phenomenon from afar. This objectivity is also what has incentivized the author to include the various regression results presented in both Section 6.3 and Section 6.5, so as to ensure that the reader can make their own judgements regarding the inferences made. Hence, the author does not see any issues in regard to the objectivity of the research.

Reliability relates, among other things, to whether the findings presented above would be found in subsequent retests (Thiétart, 2001). The approach to sample collection was clearly outlined in a previous Section 6.1, and thus it is difficult to deduce whether the tests could have been run on a different group of private equity transactions unless one changes the time frame or geography in question. Given the static nature of the data employed in the regression models, it is also difficult to imagine that a subsequent retest using the same data would not yield identical results. Hence, if a subsequent researcher were to use the same dataset, they would reach the same conclusions as the author[20].

While little commentary can be given in regard to reliability and objectivity, the validity of the results should be discussed more in depth. Validity can be discussed in regard to internal and external validity.

Internal validity relates to whether the changes in the dependent variable are actually linked to a given independent variable (Thiétart, 2001), i.e. if developments in operational performance are actually linked to one of the ownership/governance factors in focus.

In regression models, there is always the risk that a confounding factor not included in the model may actually explain changes in the dependent variable (Agresti et al., 2017; Thiétart, 2001). While the author has made an array of attempts to control for such confounding factors, e.g. by including a number of control variables, there is no doubt a risk that the internal validity of the results may be affected by other

[20] The dataset used in for statistical analysis in Stata has been included in its original format via the digital exam platform. The author can supply further data upon request and can be contacted at joli15ad@student.cbs.dk.

exogenous forces. One could ponder as to whether further assessment of company financials could have been conducted to e.g. deduce changes/differences in accounting practices, or whether different control variables could have been included. A particular limitation in regard to the latter relates to the timing of the investment. A portfolio company that is acquired early in year '0', i.e. t-0, may have more potential to see value creating mechanisms than a company acquired later in year '0'. While one could have imagined controlling for this using a variable(s) that indicated the timing of the investment, doing so would have required intimate knowledge of when the private equity company took legal and practical ownership of the given company.

Another salient limitation relating to control variables pertains to the industry and time adjustments that were innate in the dependent variable. As noted, these adjustments were derived by assessing the change in the given performance measure for companies within the same industry over the same time period as the given event period. Inevitably, using all companies within a given industry may result in some distortions. In using the industries as a whole, the adjustments relative to the raw changes are inevitably small. One would not expect industries as whole to see the same level of changes in their operational performance seen in the individual portfolio companies over a mere couple of years. These relatively small adjustments are also observed in similar research (see e.g. Bergström et al. (2007), Meuleman et al. (2009), and Svanberg & Wanzelius (2013)). Hence, the author does not see this as a problem. Yet, small adjustments aside, it became apparent that the private equity portfolio companies in focus were typically large companies within their industries. One might argue that comparing the performance in the portfolio companies with performance in the industry as a whole, which encapsulates small companies as well, distorts the adjustments. As mentioned, a number of authors have used proprietary matching methods in which they seek to adjust for the performance changes using a select number of control companies that are similar to the portfolio companies that are similar in size, prior profitability, or other factors, e.g. Guo et al. (2011). While, the author recognizes the strength of these approaches, the author deemed it appropriate to use the industries as a whole, given not only the similar approaches in previous theses (Müller & Hansen, 2014), but also the fact that the aforementioned matching methods may be subject to a degree of selection bias. Nevertheless, the robustness check employing adjustments based on proprietary control groups appeared to indicate that the type of adjustment was not salient for the findings.

External validity focuses on whether the results that have been obtained can be generalized (Thiétart, 2001). In relation to this, one point of discussion inevitably relates to the sample at hand. As mentioned, the sample was constructed so as to include all relevant transactions in the given time period and

geography of focus. Nevertheless, the sample construction process was limited in a number of regards. Some transactions had to be excluded due to lacking or inconclusive information. Some transactions had to be excluded given that the companies in question went bankrupt/were sold within the event period in focus. Some transactions had to be excluded given the nature of the company in question, e.g. financial institutions, or abnormal transactions, e.g. relating to fusions. These criteria were necessary so as to be able to gather accurate and comparable data, but no doubt impact the generalizability of the study and may have led to some unintended selection bias.

A further point limiting the generalizability relates to the dependent variables in focus, namely balance sheet based profitability measures, within a specific time frame. The focus on these measures within the specified event period limits the generalizability of the findings to other post-transaction operational performance changes that have been the focus of similar research, e.g. growth or efficiency, and broader event periods, e.g. the entire holding period for the given transaction. As mentioned, the choices made in regard to the event period stemmed from the fact that the author was limited in regard to data collection and the focus on profitability was rooted in the fact that such measures appear to have been the primary focus in previous private equity research.

Finally, aside from objectivity, reliability, and validity, a more theoretical limitation exists in dealing with regression results, namely the possibility of so-called Type 1 and Type 2 errors. As noted, the null-hypotheses related to the individual variable coefficients asserted that the variables had a coefficient of zero. These null-hypotheses were assessed in regard to the levels of statistical significance seen in the regression analysis and either rejected or not rejected. Type 1 errors relate to the fact that one might reject a null-hypothesis based on a given level of significance, despite the null-hypothesis being true in reality. In other words, one might conclude that a given variable has an effect based on the statistical evidence, despite this not being the case in real life. Such errors may have occurred in the inferences made in relation to the variables pertaining to domestic ownership, involvement of private equity board members, and the role of prior family involvement. On the flipside, Type 2 errors pertain to the fact that null-hypotheses that are false in reality may not been rejected given the observed significance levels. In other words, a given variable may have an effect in real life, but not see significance in the given sample. Such errors may have occurred in regard to the variables relating to CEO change, industry focused ownership, and prior private equity involvement. (Agresti et al., 2017)

In sum, while the author finds little to detract from the objectivity or reliability of the results, it is apparent that there are some factors that detract from the validity of the results. This preceding Section is by no

means an attempt to undermine the results, yet important to consider in reflecting upon the results alongside the robustness tests conducted.

8. Implications

Having not only explored the existing findings relating to the selected ownership/governance factors, but also tested the conceptual model in an empirical setting, it seems fitting to consider the implications for the audience of the thesis. This will be done based both on the findings from previous authors and the findings from the empirical analysis.

At an overall level, it is imperative for private equity industry participants to acknowledge that the face of private equity has changed. As uncovered, the industry no longer bases its existence on the capture of value through arbitrage, but rather, yearns to create value in portfolio companies through active ownership. This inevitably poses a challenge for both private equity investors and the employees of private equity companies. The latter need to acknowledge their role as part investor and part company builder. The former need to acknowledge that private equity companies and portfolio companies are heterogeneous and that their individual characteristics may represent challenges or opportunities in the current private equity climate.

While existing literature revealed support for the notion that industry focused owners are preferable, the empirical analysis did not seem to echo these findings. Nevertheless, it is apparent that the private equity industry is increasingly becoming a saturated place, with increasing levels of activity. Hence, private equity companies should consider whether employing an industry focus could be amicable, both in regard to driving value creation, but also standing out in the search for investments from private equity investors.

Both existing literature and the empirical analysis revealed evidence that domestic private equity owners are linked with superior post-transaction operational performance. Given the changing face of private equity, it is unsurprising that local private equity companies, with the ability to actively engage with culturally similar portfolio companies, see amicable results. Yet, as noted, cross-border private equity activity is increasing. Hence, both private equity investors and private equity companies should approach this trend with caution. Private equity investors should critically assess a given fund's geographic investment strategy. Private equity companies should approach potential foreign investments with caution and thoroughly assess their abilities to engage with portfolio companies outside the borders of their home country.

While the effect of e.g. foreign ownership may seem clear, existing literature and the empirical analysis showed ambiguous results in regard to prior ownership characteristics of the acquired companies. The

effects of prior private equity ownership appears to be ambiguous as do the general effects of prior family involvement. Nevertheless, based on both past literature and the weak empirical findings presented in the regression results, it appears that portfolio companies with prior family involvement may represent troublesome investments, contingent on no CEO changes taking place. Hence, private equity companies should thoroughly consider investments into family companies and also their application of the equity toolbox in such companies.

While CEO changes in portfolio companies with prior family involvement may be amicable, the empirical analysis did not echo prior evidence that such concrete application of the private equity toolbox leads to superior results in other types of companies. Nevertheless, in keeping with private equity companies' emerging role as company builders, active involvement in portfolio companies, e.g. through management changes, should inevitably be considered. It seems that a hands-off approach to the daily activities of portfolio companies does not suffice in the current private equity climate.

The need for hands-on involvement in portfolio companies seems further warranted by the evidence that companies with higher proportions of private equity board members see superior changes in post-transaction operational performance. Private equity companies must consider their capacity to engage with portfolio companies through such representation, and thereby consider the scope of their investment activities. While diversification through a large number of portfolio companies may reduce investment risk, it may limit the ability of private equity company employees to apply the private equity toolbox.

Hence, there appears to a range of implications for both investors in the private equity space, but also the private equity companies that operate within it. These implications do not merely relate to inherent predispositions, but also the application of the private equity toolbox.

9. Conclusion

This thesis has revealed that the private equity industry has developed from being a minute facet of the investment world to one in which gargantuan amounts of money are invested. In keeping with this development, an increasing amount of literature has been dedicated to study the private equity industry. While the initial research primarily focused on the performance of private equity owned portfolio companies relative to their peers, the nature of private equity literature is changing. The face of private equity has developed, with private equity owners no longing merely trying to capture value from their investments, but increasingly trying to create value through active ownership, making full use of the private equity toolbox. A number of authors have tried to ascertain if any of the specific actions taken by

private equity companies in their application of the toolbox can be linked with superior value creation. Yet, a number of authors have also noted that inherent predispositions, such as prior ownership characteristics, may impact the extent to which private equity companies can engage in active value creation. This thesis has followed in the footsteps of this emerging theme of research, exploring the role of pre- and post-transaction ownership/governance factors in private equity, and their impact on the operational performance changes in portfolio companies.

Based on a detailed literature review and understanding of the private equity asset class, this thesis developed a conceptual model that hypothesized the impact of ownership/governance factors on operational performance changes in portfolio companies. A number of factors relating the concrete application of the toolbox, namely CEO change and levels of private equity board representation were hypothesized to be linked with superior post-transaction operational performance changes. Given the superior monitoring abilities and capabilities of domestic and industry focused private equity companies, it was hypothesized that portfolio companies acquired by such private equity companies would also see superior operational performance changes. However, on the flip side, the application of the private equity toolbox was theorized to be limited in portfolio companies that had either prior family involvement or prior private equity involvement, thus leading to inferior operational performance changes in such companies. Furthermore, a separate hypothesis stipulating the interplay between CEO change and prior family involvement was created based on such companies' unique traits.

The conceptual model was tested in an empirical setting using a hand collected sample of 83 Danish private equity transactions in the post financial crisis era. The results of this analysis found support for a number of the hypothesized relationships. Specifically, it was noted that portfolio companies acquired by domestic private equity companies saw superior operational performance changes following the transaction. Such superior changes were also identified in portfolio companies with higher proportions of private equity board members. The finding in regard to this board presence should be approached with some caution, given the findings from the robustness tests and the difficulty constructing the variable.

Interestingly, neither prior private equity ownership, ownership by an industry focused private equity company, nor CEO changes were statistically linked with any impact on operational performance changes. This in contrast with preceding literature, which notes that portfolio companies with prior private equity ownership should have lower potential for performance improvements, that industry focused private equity companies should be better at creating value through active ownership, and that CEO changes proxy active strategic involvement.

The lack of statistical significance was also generally seen in regards to the impact of prior family involvement, despite strong theoretical arguments for why prior family influence may impact portfolio companies. Nevertheless, weak statistical evidence was found for the notion that family companies that did not see changes in their CEO, i.e. keeping an existing family CEO, saw inferior operational performance changes. The aforementioned inference was made on the basis of statistical significance levels outside the bounds of accepted and conventional levels, and should thus be approached with a high degree of caution. This caution is further warranted by the lack of significance seen in the alternative specifications and robustness tests.

Based on the findings from both the literature review and empirical test, it is clear that there a number of implications for the participants within the private equity industry. Importantly, these participants need to understand that private equity no longer seems to rely on mere arbitrage for capturing value. Rather, private equity seeks to create value by being active owners. Given the findings relating to domestic ownership and levels of private equity board representation, it is apparent that private equity companies should consider their investment scope so as to not hinder their ability to monitor and engage with portfolio companies. Despite the hypotheses relating to prior family ownership not seeing clear empirical support, it is apparent that there exists theoretical support for the notion that family companies should be approached with caution. Investors in private equity can also use these findings to guide their interaction with private equity companies and their decisions to invest in funds or not.

10. Suggestions for future research

While the understanding of what drives operational performance changes in private equity portfolio companies is advancing, it seems that much remains to be explored and understood. This thesis has attempted to be as holistic as possible, covering a number of pre- and post-transaction factors, yet no doubt faced limitations in doing so. As such, a number of suggestions can be made for further research. These suggestions relate to both the factors considered and the manner in which they were considered.

As noted, this thesis noted the positive impact of domestic private equity. However, in doing so, the thesis did not account for the fact that some foreign private equity companies may have local offices or employees. Further research may very well be able to consider this, contingent on access to more detailed information regarding the private equity companies.

Another factor that could be studied further contingent on more detailed information is the role of prior family involvement. While this thesis contributes to the lacking coverage of the role of prior family ownership in private equity literature, it is apparent that more can be done. The author was forced to

manually classify the companies included in the sample as previously family owned or not based on three aforementioned criteria, i.e. majority ownership, family presence on the board, and a family CEO. Yet, family companies are heterogeneous animals with differing levels of 'familiness' (Litz, 1995). Further research could, contingent on more detailed information, study how various levels of prior 'familiness' impacts performance as a private equity portfolio company. This could be done by e.g. using more intricate scales of 'familiness' as introduced by e.g. Astrachan, Klein, and Smyrnios (2002).

The variable used to measure the impact of varying levels of private equity board presence only captured board members who were linked with the acquiring private equity company through employment or other formal links. Hence, in regard to the role of private equity board members, further research could be directed at the role of board members who may not be formally linked with a private equity acquirer, but who may appointed by the acquirer and thereby serve as an informal extension of the private equity governance mechanism.

It is clear that that further analysis in larger samples should be considered so as to deduce if the findings are robust. Aside from this, the manner in which the ownership/governance factors were considered could be changed in future research. This thesis considered only a select number of balance sheet based profitability measures in a select event period. Further research could emulate the analysis using different event periods or other performance measures. Likewise, future research could emulate the study in different geographies, given that this thesis solely focused on Danish private equity portfolio companies.

Future research could also consider taking a different approach to studying the factors all together. This thesis relied on statistical analysis to explore the impact of the given factors. However, it could also be interesting to conduct a multiple case study approach, exploring the factors in a more qualitative manner. Such an approach could further the understanding of the dynamics at play in the current private equity climate.

Hence, while the author is confident that the thesis at hand contributes to the existing literature, it is worth stressing that an array of future research could be conducted. Such research may emulate the study using slight tweaks to the approach taken or may even consider the ownership/governance factors through a completely different methodological lens.

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Databases: CVR Registry, Greens, LinkedIn, Orbis, Valu8, Zephyr

Appendices

Appendix 1: Description of databases used

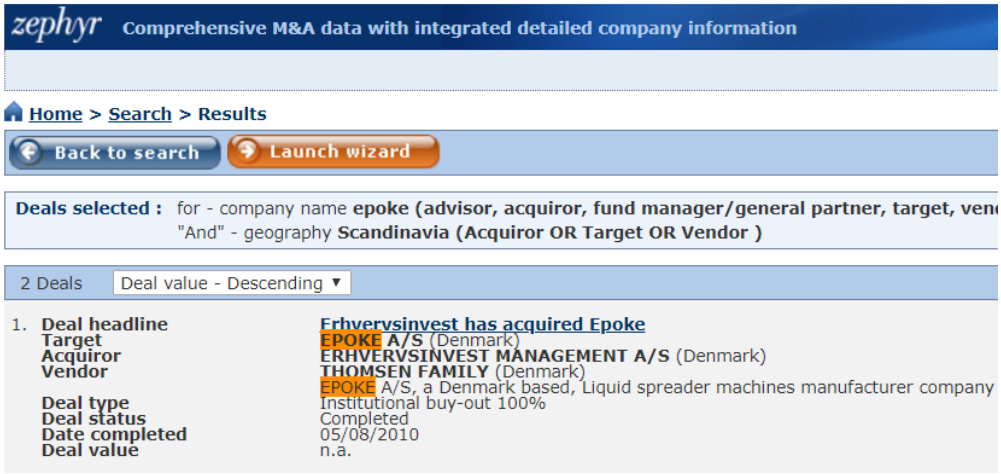
- CVR Registry: Access to annual reports for Danish companies alongside other information. relating to e.g. ownership, incorporation, etc.
- Greens: Financial and ownership data for listed companies in Denmark.
- LinkedIn: Professional networking website.
- Orbis: Financial and ownership data for listed and unlisted companies globally.
- Valu8: Financial and ownership data for listed companies in Scandinavia.
- Zephyr: News and details related to global M&A, private equity, and IPO activity.

Appendix 2: Example of Zephyr vendor descriptions

Screenshot: Example of determining prior private equity ownership through Zephyr

Source: Screenshot from Zephyr

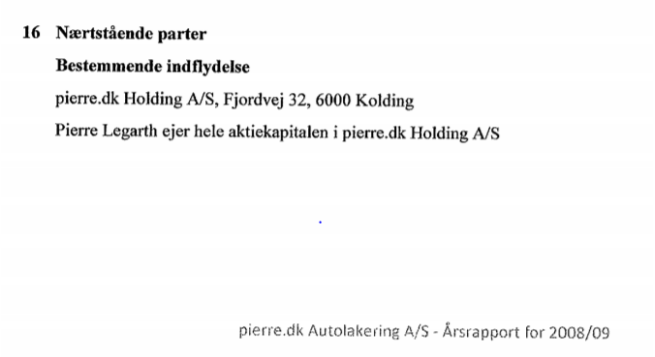
Screenshot: Example of determining family ownership through Zephyr



Source: Screenshot from Zephyr

Appendix 3: Example of determining ownership through annual reports and press releases

Screenshot: Example of determining family ownership through annual reports



16 Nærtstående parter

Bestemmende indflydelse

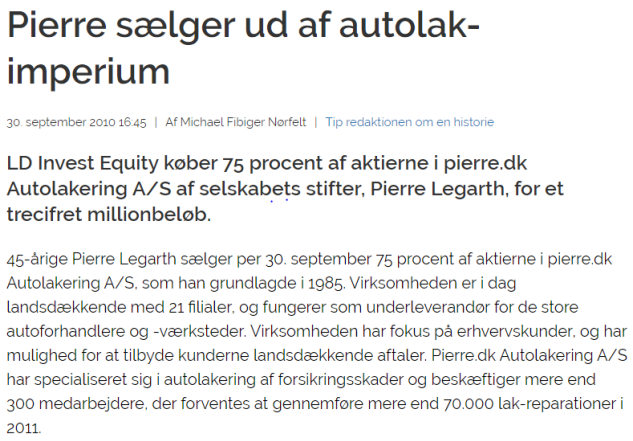
pierre.dk Holding A/S, Fjordvej 32, 6000 Kolding

Pierre Legarth ejer hele aktiekapitalen i pierre.dk Holding A/S

pierre.dk Autolakering A/S - Årsrapport for 2008/09

Source: Screenshot from pierre.dk Autolakering A/S 2008/2009 annual report, p. 18 (source in Bibliography, Pierre.dk (2009))

Screenshot: Example of determining family ownership through news articles



Pierre sælger ud af autolak-imperium

30. september 2010 16:45 | Af Michael Fibiger Nørfelt | Tip redaktionen om en historie

LD Invest Equity køber 75 procent af aktierne i pierre.dk Autolakering A/S af selskabets stifter, Pierre Legarth, for et trecifret millionbeløb.

45-årige Pierre Legarth sælger per 30. september 75 procent af aktierne i pierre.dk Autolakering A/S, som han grundlagde i 1985. Virksomheden er i dag landsdækkende med 21 filialer, og fungerer som underleverandør for de store autoforhandlere og -værksteder. Virksomheden har fokus på erhvervskunder, og har mulighed for at tilbyde kunderne landsdækkende aftaler. Pierre.dk Autolakering A/S har specialiseret sig i autolakering af forsikringsskader og beskæftiger mere end 300 medarbejdere, der forventes at gennemføre mere end 70.000 lak-reparationer i 2011.

Source: Screenshot from article published on MotorMagasinet.dk (source in Bibliography, Nørfelt (2010))

Appendix 4: Extended regression tables

Table A 1: Regression results, ΔROA, NI-based, extended table

Table A 1 presents the OLS regression results for post-transaction changes in operational performance, as measured by the industry adjusted change in return on assets (ΔROA, NI) from the year prior to the transaction till two years following the transaction, in relation to select ownership/governance factors. The coefficients of the variables indicate percentage point changes, i.e. with 0.103 indicating 10.3 percentage point increase. All models are have *F*-statistics that are significant at the 0.05 level. Definitions of the independent and the included control variables are as per the preceding sections and all other econometric specifications follow Section 5.2.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Family Company	-0.018						-0.032	-0.037
	(0.029)						(0.030)	(0.032)
Secondary		-0.029					-0.033	-0.033
		(0.029)					(0.031)	(0.032)
Domestic			0.053*				0.051*	0.052*
			(0.028)				(0.028)	(0.028)
Industry Focus				-0.007			0.002	0.003
				(0.028)			(0.026)	(0.025)
PE Board Ratio					0.003		-0.018	-0.019
					(0.058)		(0.063)	(0.064)
CEO Change						0.009	0.007	0.005
						(0.025)	(0.025)	(0.029)
Fam*CEO Change								0.007
								(0.050)
Prior profitability	-0.562***	-0.561***	-0.486***	-0.554***	-0.558***	-0.558***	-0.500***	-0.499***
	(0.094)	(0.095)	(0.111)	(0.097)	(0.095)	(0.094)	(0.113)	(0.112)
Prior size	-0.002	0.004	0.015	0.001	-0.000	0.000	0.015	0.015
	(0.011)	(0.012)	(0.014)	(0.013)	(0.012)	(0.011)	(0.015)	(0.015)
Constant	0.031	-0.035	-0.224	-0.012	-0.000	-0.006	-0.196	-0.196
	(0.146)	(0.154)	(0.191)	(0.160)	(0.162)	(0.147)	(0.195)	(0.195)
Obs.	83	83	83	83	83	83	83	83
R-squared	0.415	0.418	0.432	0.412	0.412	0.413	0.445	0.445
F-statistic	19.111	17.764	25.686	18.160	18.470	18.395	10.130	9.032

Huber-White heteroscedasticity robust standard errors are noted in in parentheses
****, **, *, and † indicate significance at 0.01, 0.05, 0.10, and 0.15 levels, respectively*

Table A 2: Regression results, ΔROA, EBIT-based, extended table

Table A 2 presents the OLS regression results for post-transaction changes in operational performance, as measured by the industry adjusted change in return on assets (ΔROA, EBIT) from the year prior to the transaction till two years following the transaction, in relation to select ownership/governance factors. The coefficients of the variables indicate percentage point changes, i.e. with 0.103 indicating 10.3 percentage point increase. All models are have *F*-statistics that are significant at the 0.05 level. Definitions of the independent and the included control variables are as per the preceding sections and all other econometric specifications follow Section 5.2.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Family Company	-0.016						-0.027	-0.056
	(0.032)						(0.035)	(0.039)
Secondary		-0.026					-0.030	-0.033
		(0.034)					(0.036)	(0.036)
Domestic			0.040				0.040	0.041
			(0.033)				(0.034)	(0.034)
Industry Focus				-0.014			-0.005	-0.000
				(0.033)			(0.033)	(0.031)
PE Board Ratio					-0.026		-0.040	-0.041
					(0.066)		(0.072)	(0.070)
CEO Change						-0.002	-0.003	-0.018
						(0.028)	(0.028)	(0.033)
Fam*CEO Change								0.050
								(0.055)
Prior profitability	-0.687***	-0.686***	-0.629***	-0.675***	-0.684***	-0.683***	-0.635***	-0.629***
	(0.097)	(0.099)	(0.116)	(0.100)	(0.098)	(0.098)	(0.120)	(0.119)
Prior size	0.003	0.008	0.016	0.007	0.003	0.005	0.017	0.017
	(0.013)	(0.014)	(0.016)	(0.015)	(0.014)	(0.013)	(0.018)	(0.018)
Constant	-0.028	-0.087	-0.224	-0.083	-0.032	-0.052	-0.196	-0.202
	(0.172)	(0.178)	(0.224)	(0.191)	(0.189)	(0.170)	(0.239)	(0.239)
Obs.	83	83	83	83	83	83	83	83
R-squared	0.464	0.466	0.470	0.464	0.463	0.462	0.479	0.484
F-statistic	33.364	32.278	37.261	32.243	33.124	32.588	13.593	12.870

Huber-White heteroscedasticity robust standard errors are noted in in parentheses
****, **, *, and † indicate significance at 0.01, 0.05, 0.10, and 0.15 levels, respectively*

Table A 3: Regression results, ΔROCE, extended table

Table A 3 presents the OLS regression results for post-transaction changes in operational performance, as measured by the industry adjusted change in return on capital employed (ΔROCE) from the year prior to the transaction till two years following the transaction, in relation to select ownership/governance factors. The coefficients of the variables indicate percentage point changes, i.e. with 0.103 indicating 10.3 percentage point increase. All models are have *F*-statistics that are significant at the 0.05 level. Definitions of the independent and the included control variables are as per the preceding sections and all other econometric specifications follow Section 5.2.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Family Company	0.098						0.071	0.014
	(0.097)						(0.102)	(0.108)
Secondary		-0.117					-0.089	-0.094
		(0.091)					(0.104)	(0.105)
Domestic			0.046				-0.013	-0.009
			(0.104)				(0.107)	(0.106)
Industry Focus				-0.052			-0.052	-0.042
				(0.090)			(0.086)	(0.082)
PE Board Ratio					0.379*		0.391*	0.389*
					(0.216)		(0.222)	(0.222)
CEO Change						0.020	-0.007	-0.037
						(0.087)	(0.086)	(0.107)
Fam*CEO Change								0.099
								(0.155)
Prior profitability	-0.854**	-0.887**	-0.814*	-0.844**	-0.874**	-0.876**	-0.850*	-0.839*
	(0.363)	(0.369)	(0.430)	(0.373)	(0.348)	(0.364)	(0.430)	(0.430)
Prior size	0.048	0.053	0.051	0.048	0.053	0.038	0.080	0.081
	(0.049)	(0.049)	(0.062)	(0.051)	(0.049)	(0.048)	(0.066)	(0.066)
Constant	-0.680	-0.677	-0.722	-0.637	-0.843	-0.543	-1.132	-1.144
	(0.665)	(0.645)	(0.855)	(0.668)	(0.677)	(0.650)	(0.913)	(0.916)
Obs.	83	83	83	83	83	83	83	83
R-squared	0.178	0.180	0.169	0.170	0.190	0.168	0.210	0.213
F-statistic	6.075	6.395	6.389	6.052	8.687	6.012	3.947	3.591

Huber-White heteroscedasticity robust standard errors are noted in in parentheses
****, **, *, and † indicate significance at 0.01, 0.05, 0.10, and 0.15 levels, respectively*

Appendix 5: Further statistics relating to robustness tests

Table A 4: Further summary statistics

Appendix 5: Further statistics relating to robustness tests

Table A 4 presents a range of summary statistics for, among other things, the variables included in the regressions conducted in Section 6. Definitions of the variables are as per Section 6.1. and winsorization has been conducted as per Section 5.2.

	Mean	Median	St. Dev	N
Dependent Variables				
ΔROA, NI	-.108	-.069	.142	83
ΔROA, EBIT	-.131	-.080	.169	83
ΔROCE	-.253	-.157	.418	83
ΔROA, NI[b]	-.106	-.069	.194	83
ΔROA, EBIT[b]	-.130	-.080	.233	83
ΔROCE[b]	-.391	-.157	1.136	83
ΔROA, NI[c]	-.102	-.074	.156	83
ΔROA, EBIT[c]	-.125	-.091	.174	83
ΔROCE[c]	-.285	-.164	.528	83
ΔROA, NI[b/c]	-.100	-.074	.200	83
ΔROA, EBIT[b/c]	-.125	-.091	.230	83
ΔROCE[b/c]	-.409	-.164	1.151	83
Independent Variables				
Family Company	.301	0	.462	83
Secondary	.253	0	.437	83
Domestic	.614	1	.490	83
Industry Focus	.386	0	.490	83
PE Board Ratio	.347	.333	.173	83
PE Board Ratio[b]	.349	.333	.177	83
CEO Change	.482	0	.503	83
Control Variables				
Prior profitability	.192	.146	.163	83
Prior profitability[b]	.201	.146	.263	83
Prior size[a]	11.762	11.712	1.213	83
Prior size[a/b]	11.757	11.712	1.272	83
Raw Measures for Dependent Variables (NB: Not used in any regressions)				
ΔROA, NI[d]	-.100	-.050	.144	83
ΔROA, EBIT[d]	-.126	-.067	.170	83
ΔROCE[d]	-.253	-.149	.405	83
ΔROA, NI[b/d]	-.099	-.050	.199	83
ΔROA, EBIT[b/d]	-.126	-.067	.235	83
ΔROCE[b/d]	-.398	-.149	1.141	83

[a]Natural logarithm applied to asset size in 1,000 DKK; [b]Unwinsorized; [c]Proprietary control adjusted; [d]Non-adjusted

Table A 5: Robustness test, no profitability control, extended table

Table A 5 presents the OLS regression results for industry adjusted post-transaction changes in operational performance, from the year prior to the year of transaction till two years following the transaction, in relation to select ownership/governance factors. The coefficients of the variables indicate percentage point changes, i.e. with 0.103 indicating 10.3 percentage point increase. All models are have *F*-statistics that are significant at the 0.05 level. Model 1 and 2 depict regression results using ΔROA, NI, Model 3 and 4 depict regression results using ΔROA, EBIT, and Model 5 and 6 depict regression results using ΔROCE. All other econometric specifications are as per Section 5.2. No prior profitability control has been used.

	(1) ΔROA, NI	(2) ΔROA, NI	(3) ΔROA, EBIT	(4) ΔROA, EBIT	(5) ΔROCE	(6) ΔROCE
Family Company	-0.022	-0.037	-0.014	-0.057	0.088	0.013
	(0.034)	(0.043)	(0.041)	(0.051)	(0.105)	(0.110)
Secondary	-0.015	-0.016	-0.008	-0.012	-0.058	-0.066
	(0.035)	(0.035)	(0.041)	(0.040)	(0.110)	(0.110)
Domestic	0.125***	0.125***	0.133***	0.134***	0.112	0.114
	(0.031)	(0.031)	(0.038)	(0.037)	(0.096)	(0.095)
Industry Focus	-0.012	-0.009	-0.023	-0.015	-0.076	-0.062
	(0.030)	(0.028)	(0.038)	(0.035)	(0.092)	(0.087)
PE Board Ratio	-0.043	-0.044	-0.071	-0.073	0.349†	0.347
	(0.085)	(0.085)	(0.096)	(0.096)	(0.238)	(0.239)
CEO Change	0.003	-0.004	-0.008	-0.030	-0.013	-0.052
	(0.029)	(0.034)	(0.034)	(0.040)	(0.090)	(0.112)
Fam*CEO Change		0.026		0.073		0.130
		(0.055)		(0.064)		(0.162)
Prior size	0.063***	0.063***	0.078***	0.078***	0.162***	0.163***
	(0.015)	(0.015)	(0.017)	(0.017)	(0.044)	(0.044)
Constant	-0.895***	-0.895***	-1.086***	-1.083***	-2.323***	-2.319***
	(0.193)	(0.192)	(0.224)	(0.221)	(0.573)	(0.572)
Obs.	83	83	83	83	83	83
R-squared	0.255	0.257	0.262	0.271	0.147	0.151
Company Controls	Yes	Yes	Yes	Yes	Yes	Yes
F-statistic	5.444	5.166	5.825	5.859	2.143	2.074

Huber-White heteroscedasticity robust standard errors are noted in in parentheses
****, **, *, and † indicate significance at 0.01, 0.05, 0.10, and 0.15 levels, respectively*

Table A 6: Robustness test, alternative adjustment, extended table

Table A 6 presents the OLS regression results for post-transaction changes in operational performance, from the year prior to the year of transaction till two years following the transaction, in relation to select ownership/governance factors. The coefficients of the variables indicate percentage point changes, i.e. with 0.103 indicating 10.3 percentage point increase. All models are have *F*-statistics that are significant at the 0.05 level. Model 1 and 2 depict regression results using ΔROA, NI, Model 3 and 4 depict regression results using ΔROA, EBIT, and Model 5 and 6 depict regression results using ΔROCE. All other econometric specifications are as per Section 5.2. Dependent variables are adjusted using proprietary control groups rather than industry-adjusted.

	(1) ΔROA, NI	(2) ΔROA, NI	(3) ΔROA, EBIT	(4) ΔROA, EBIT	(5) ΔROCE	(6) ΔROCE
Family Company	-0.020	0.001	-0.030	-0.058	0.065	-0.055
	(0.032)	(0.036)	(0.036)	(0.041)	(0.141)	(0.180)
Secondary	-0.018	-0.015	-0.009	-0.012	-0.022	-0.035
	(0.034)	(0.035)	(0.036)	(0.036)	(0.130)	(0.131)
Domestic	0.057*	0.055*	0.027	0.028	-0.095	-0.088
	(0.029)	(0.029)	(0.031)	(0.030)	(0.157)	(0.152)
Industry Focus	-0.026	-0.030	-0.028	-0.023	-0.120	-0.099
	(0.028)	(0.027)	(0.034)	(0.032)	(0.115)	(0.105)
PE Board Ratio	0.044	0.045	-0.018	-0.019	0.613**	0.608**
	(0.066)	(0.067)	(0.068)	(0.068)	(0.294)	(0.290)
CEO Change	0.015	0.027	0.006	-0.008	0.029	-0.034
	(0.027)	(0.032)	(0.029)	(0.033)	(0.118)	(0.136)
Fam*CEO Change		-0.038		0.048		0.208
		(0.054)		(0.059)		(0.221)
Prior profitability	-0.543***	-0.547***	-0.689***	-0.684***	-1.083*	-1.060*
	(0.121)	(0.120)	(0.123)	(0.122)	(0.611)	(0.602)
Prior size	0.022	0.022	0.014	0.014	0.070	0.073
	(0.016)	(0.016)	(0.017)	(0.017)	(0.087)	(0.086)
Constant	-0.296	-0.291	-0.143	-0.149	-1.031	-1.057
	(0.210)	(0.210)	(0.230)	(0.229)	(1.216)	(1.210)
Obs.	83	83	83	83	83	83
R-squared	0.462	0.465	0.503	0.507	0.187	0.194
Company Controls	Yes	Yes	Yes	Yes	Yes	Yes
F-statistic	12.924	10.776	14.299	13.442	3.248	2.948

Huber-White heteroscedasticity robust standard errors are noted in in parentheses
****, **, *, and † indicate significance at 0.01, 0.05, 0.10, and 0.15 levels, respectively*

Table A 7: Robustness test, no winsorization, extended table

Table A 7 presents the OLS regression results for industry adjusted post-transaction changes in operational performance, from the year prior to the year of transaction till two years following the transaction, in relation to select ownership/governance factors. The coefficients of the variables indicate percentage point changes, i.e. with 0.103 indicating 10.3 percentage point increase. All models are have *F*-statistics that are significant at the 0.05 level, except models 5 and 6. Model 1 and 2 depict regression results using ΔROA, NI, Model 3 and 4 depict regression results using ΔROA, EBIT, and Model 5 and 6 depict regression results using ΔROCE. No winsorization conducted. All other econometric specifications are as per Section 5.2.

	(1) ΔROA, NI	(2) ΔROA, NI	(3) ΔROA, EBIT	(4) ΔROA, EBIT	(5) ΔROCE	(6) ΔROCE
Family Company	-0.059†	-0.053	-0.052	-0.068†	0.234	-0.035
	(0.038)	(0.037)	(0.040)	(0.045)	(0.186)	(0.229)
Secondary	-0.042	-0.041	-0.030	-0.032	-0.420	-0.449
	(0.034)	(0.035)	(0.040)	(0.041)	(0.410)	(0.431)
Domestic	0.042	0.042	0.031	0.032	0.040	0.058
	(0.029)	(0.030)	(0.036)	(0.036)	(0.362)	(0.371)
Industry Focus	0.003	0.002	0.000	0.003	-0.133	-0.085
	(0.027)	(0.025)	(0.033)	(0.031)	(0.186)	(0.160)
PE Board Ratio	-0.060	-0.060	-0.084	-0.084	0.263	0.256
	(0.078)	(0.079)	(0.085)	(0.085)	(0.682)	(0.679)
CEO Change	0.009	0.012	0.001	-0.008	-0.245	-0.389
	(0.028)	(0.032)	(0.032)	(0.037)	(0.285)	(0.399)
Fam*CEO Change		-0.011		0.029		0.470
		(0.059)		(0.062)		(0.415)
Prior profitability	-0.553***	-0.554***	-0.708***	-0.705***	-1.737*	-1.686†
	(0.120)	(0.121)	(0.130)	(0.131)	(1.042)	(1.045)
Prior size	-0.003	-0.003	-0.004	-0.003	0.133	0.143
	(0.020)	(0.020)	(0.022)	(0.023)	(0.163)	(0.168)
Constant	0.058	0.059	0.094	0.088	-1.518	-1.600
	(0.278)	(0.280)	(0.310)	(0.312)	(2.088)	(2.128)
Obs.	83	83	83	83	83	83
R-squared	0.568	0.568	0.639	0.640	0.243	0.251
Company Controls	Yes	Yes	Yes	Yes	Yes	Yes
F-statistic	10.333	8.931	11.314	10.179	1.641	1.529

Huber-White heteroscedasticity robust standard errors are noted in in parentheses
****, **, *, and † indicate significance at 0.01, 0.05, 0.10, and 0.15 levels, respectively*

Table A 8: Robustness test, no profitability control, unwinsorized variables

Table A 8 presents the OLS regression results for industry adjusted post-transaction changes in operational performance, from the year prior to the year of transaction till two years following the transaction, in relation to select ownership/governance factors. The coefficients of the variables indicate percentage point changes, i.e. with 0.103 indicating 10.3 percentage point increase. All models are have *F*-statistics that are significant at the 0.05 level, except model 5 and 6. Model 1 and 2 depict regression results using ΔROA, NI, Model 3 and 4 depict regression results using ΔROA, EBIT, and Model 5 and 6 depict regression results using ΔROCE. No winsorization has been conducted. All other econometric specifications are as per Section 5.2. No prior profitability control has been used.

	(1) ΔROA, NI	(2) ΔROA, NI	(3) ΔROA, EBIT	(4) ΔROA, EBIT	(5) ΔROCE	(6) ΔROCE
Family Company	-0.030	-0.061	-0.014	-0.078	0.327	-0.059
	(0.050)	(0.059)	(0.060)	(0.071)	(0.244)	(0.209)
Secondary	-0.024	-0.028	-0.008	-0.015	-0.365	-0.409
	(0.039)	(0.040)	(0.048)	(0.049)	(0.408)	(0.428)
Domestic	0.135***	0.136***	0.150***	0.152***	0.333	0.345
	(0.033)	(0.033)	(0.043)	(0.042)	(0.294)	(0.298)
Industry Focus	-0.008	-0.002	-0.014	-0.002	-0.167	-0.097
	(0.032)	(0.030)	(0.040)	(0.037)	(0.189)	(0.168)
PE Board Ratio	-0.044	-0.045	-0.063	-0.065	0.315	0.302
	(0.123)	(0.123)	(0.146)	(0.146)	(0.772)	(0.767)
CEO Change	-0.020	-0.037	-0.036	-0.070	-0.336	-0.538
	(0.041)	(0.053)	(0.051)	(0.066)	(0.307)	(0.432)
Fam*CEO Change		0.054		0.112		0.668
		(0.073)		(0.084)		(0.467)
Obs.	83	83	83	83	83	83
R-squared	0.157	0.160	0.169	0.180	0.124	0.141
Company Controls	Yes	Yes	Yes	Yes	Yes	Yes
F-statistic	4.918	4.984	5.041	5.218	1.083	0.946

Huber-White heteroscedasticity robust standard errors are noted in in parentheses
****, **, *, and † indicate significance at 0.01, 0.05, 0.10, and 0.15 levels, respectively*

Table A 9: Regression results, alternative adjustment and unwinsorized variables

Table A 9 presents the OLS regression results for industry adjusted post-transaction changes in operational performance, from the year prior to the year of transaction till two years following the transaction, in relation to select ownership/governance factors. The coefficients of the variables indicate percentage point changes, i.e. with 0.103 indicating 10.3 percentage point increase. All models are have *F*-statistics that are significant at the 0.05 level, except model 5 and 6. Model 1 and 2 depict regression results using ΔROA, NI, Model 3 and 4 depict regression results using ΔROA, EBIT, and Model 5 and 6 depict regression results using ΔROCE. No winsorization conducted. All other econometric specifications are as per Section #. Dependent variables are adjusted using proprietary control groups rather than industry-adjusted.

	(1) ΔROA, NI	(2) ΔROA, NI	(3) ΔROA, EBIT	(4) ΔROA, EBIT	(5) ΔROCE	(6) ΔROCE
Family Company	-0.032	-0.008	-0.036	-0.062	0.189	-0.160
	(0.038)	(0.039)	(0.040)	(0.044)	(0.213)	(0.285)
Secondary	-0.024	-0.021	-0.006	-0.009	-0.327	-0.374
	(0.035)	(0.037)	(0.039)	(0.039)	(0.410)	(0.432)
Domestic	0.067**	0.065**	0.042	0.044	-0.048	-0.010
	(0.030)	(0.031)	(0.034)	(0.034)	(0.368)	(0.379)
Industry Focus	-0.029	-0.034	-0.029	-0.024	-0.231	-0.170
	(0.028)	(0.026)	(0.035)	(0.033)	(0.209)	(0.176)
PE Board Ratio	0.027	0.028	-0.015	-0.016	0.473	0.475
	(0.076)	(0.076)	(0.084)	(0.085)	(0.689)	(0.681)
CEO Change	0.022	0.035	0.015	0.000	-0.171	-0.363
	(0.029)	(0.034)	(0.031)	(0.036)	(0.291)	(0.397)
Fam*CEO Change		-0.042		0.046		0.615
		(0.061)		(0.063)		(0.442)
Obs.	83	83	83	83	83	83
R-squared	0.578	0.580	0.646	0.647	0.221	0.236
Company Controls	Yes	Yes	Yes	Yes	Yes	Yes
F-statistic	11.025	9.498	12.645	11.285	1.899	1.612

Huber-White heteroscedasticity robust standard errors are noted in in parentheses
****, **, *, and † indicate significance at 0.01, 0.05, 0.10, and 0.15 levels, respectively*