

Managing the Deal: CEO Turnover in LBOs - Evidence from Sweden*

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ABSTRACT

This study examines CEO turnover in Private Equity (PE) and other privately held companies in Sweden by means of an exploratory research approach. A variety of causes and consequences of CEO turnover are tested systematically along the typical Private Equity investment process structure. The analysis is underpinned by unique, hand-picked data constituting a sample of 124 PE sponsored transactions and matched other private firm observations in Sweden between 1999 and 2017. The sample reveals significant differences in CEO turnover between the PE- (66%) and other privately held companies (39%). The differences are found to persist when controlling for conceivable endogenous and exogenous factors. In addition, examining distinct stages and aspects of the PE investment process similarly exposes noteworthy differences in CEO turnover within the set of PE sponsored transactions. This study contributes to three notable gaps in the literature. Firstly, it examines a previously largely neglected class of PE investments that account for the majority of the market. Secondly, it investigates the entire investment period, rather than mere fractions of the same. Finally, it draws novel inferences by complementing the analysis with an assessment of other privately held companies. The results of this study suggest that CEO turnover, be it voluntary or involuntary, is a markedly common situation in Private Equity investments and that managing the same is a source of value creation which received limited attention in academia thus far.

Keywords: Private Equity, Leveraged Buyout, LBO, CEO Turnover, Management Replacement

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Glossary

B&B	Buy-&-build
CEO	Chief executive officer
EBIE	Earnings before interest expenses (and taxes)
EBIT	Earnings before interest and taxes
EBITDA	Earnings before interest, taxes, depreciation and amortization
IBI	Institutional buy-in
IBO	Institutional buyout
IPO	Initial public offering
LBO	Leveraged buyout
MBO	Management buyout
OPE	Other Private Equity
P2P	Public-to-private
PCBO	Private company buyout
PE	Private Equity
ppts	Percentage points
SBO	Secondary buyout
SME	Small and medium-sized enterprises
SNI	Swedish standard industrial classification
SVCA	Swedish Venture Capital Association
TBO	Tertiary buyout
VIF	Variance inflation factor

1. Introduction

The standard investment strategy of buying low and selling high (Lei & Yao, 2015) may in hindsight seem like the one Private Equity (PE) generated returns with in the early days. While that would be a stark oversimplification, generating the high returns characteristic for the asset class has undeniably become an increasingly complex task since the emergence of the industry in the early 1980s. This is in large part attributable to the triumph of the asset class and the naturally coinciding rise in competition. The success of the asset class is indisputable. Private Equity funds in the US for example have grown virtually exponentially since their emergence, from USD 0.2 billion in committed capital in 1980 to USD 200 billion in 2007 (Kaplan & Strömberg, 2009). Even in the aftermath of the global financial crisis, the industry recovered swiftly, raising funds adding to soaring levels of un-deployed capital ever since 2012 (Bain & Company, 2019). In accord with the rise of the asset class, competition soared. This rapid increase in both capital and competition naturally diminishes return prospects (Ljungqvist & Richardson, 2003). In response to this trend, Private Equity investors increasingly often take an active approach to managing their investments. This manifests for example in a surge of operational value creation (Brigl, Nowotnik, Pelisari, Rose, & Zwillenberg, 2012) and the pursuit of more challenging investment strategies (Bain & Company, 2018).

One approach to active management is steering senior personnel decisions. Rogers, Holland, and Haas (2002) attest active involvement in the hiring and firing of management to be a notable component in returns generated by Private Equity. Similarly, Gompers, Kaplan, and Mukharlyamov (2016) deem it a lever of active governance at portfolio company level. The arguably most important personnel decisions evolve around the CEO (chief executive officer). The majority of CEO turnover literature focuses on public companies and, to a lesser extent, on private as well as PE-backed firms. The relevant Private Equity literature principally aims to illuminate agency theory and corporate governance aspects associated with CEO turnover. This strand of theory is largely composed of studies examining large public-to-private (P2P) transactions, i.e. deals involving the delisting of previously publicly traded companies from the stock market (Cornelli & Karakaş, 2015; Gong & Wu, 2011; Guo, Hotchkiss, & Song, 2011). Curiously, CEO turnover rates in P2Ps are found to be higher vis-à-vis public peers in the early phases of the

holding period. The previous literature focuses narrowly on the change in ownership concentration when firms are taken private and the immediate implications for CEO turnover. The literature has till date neither sufficiently addressed the longer-term implications of PE ownership for CEO turnover, nor has it examined private company buyouts (PCBO) in depth, which make up the vast majority of PE transactions (Kaplan & Strömberg, 2009). Finally, the turnover in buyouts relative to firms with other private owners has thus far received no attention at all. This study aims to address these three main gaps in the literature. It therefore examines CEO turnover patterns in a unique set of private company buyouts across the entire holding period and contrasts with other privately held peers using an exploratory research approach.

The incompleteness of the previous literature with respect to the three aspects outlined above is attributable to the absence of readily available, comprehensive data on privately held companies. An implicit contribution of this study is thus also the composition of a unique, hand-picked data, set combining an extensive array of information on PCBOs and other privately held (hereinafter other Private Equity or OPE) firms. The PE-backed firm portion of the sample is systematically delimited to reflect the entire holding period of PCBOs orchestrated by some of the most relevant Swedish Private Equity investors in the domestic market between 1999-2017. Analogously, the set of OPE-backed companies is matched meticulously to the corresponding PE-backed firms to allow for meaningful inferences between the two sub-samples. The subsequent analysis is guided by the typical stages of the PE investment process, in order to elucidate patterns, causes and consequences of CEO turnover, both within the PE sample and vis-à-vis the OPE sample. In addition, a control group consisting of international PE investors active in the Swedish market controls for conceivable biases from focusing on domestic investors, a distinction commonly neglected in the literature. The analysis of this data set propels the three main contributions of this study to the existing literature and spans a wide spectrum of results.

In examining PCBOs, this study finds an extraordinarily high turnover rate of 66.1% across the holding period, markedly more than in the OPE sample (38.7%). This rate exceeds those observed in studies examining P2P investments (viz. Cornelli & Karakaş, 2015; Gong & Wu, 2011; Guo et al., 2011) and is at the upper end of the range compared to studies focusing on transactions broadly definable as PCBOs (viz. Acharya, Gottschalg, Hahn, & Kehoe, 2012; Cornelli, Kominek, &

Ljungqvist, 2013; Räisänen, 2017). This difference is especially striking considering that previous studies have usually focused on the beginning of the holding period only, when turnover tends to be higher (Cornelli & Karakaş, 2015). Moreover, the PE sample of PCBOs is found to exhibit distinct turnover patterns with respect to a variety of factors, most notably seller type and exit route. Firstly, CEO turnover differs distinctly across the types of sellers to PE investors at entry of the investment. Specifically, firms acquired from founders or founding families and other financial investors are found to exhibit elevated CEO turnover (74% and 67%, respectively). This suggests divergent demands in managing CEO turnover across firms acquired from different seller types. Secondly, CEO turnover varies substantially across different exit routes, i.e. types of buyers PE investors divest to. Most notably, firms exited to the public capital markets and strategic investors show distinctly higher than average turnover rates (78% and 70%, respectively), indicating divergent CEO requirements based on the subsequent buyer.

Investigating the entire holding period, as opposed to the mere fragments examined in many previous studies, demonstrates a statistically significant association between CEO turnover and holding period length. While this relation appears intuitive, *inter alia* due to the fact that economical and contractual features dis-incentivize voluntary departures of CEOs in PE-backed companies, a more nuanced interpretation is advisable. Moreover, though CEO turnover tends to increase up until the median holding period in the PE sample, it decreases thereafter, rendering the relationship non-linear and insinuating that both short and long holding periods require less active management of CEO turnover. In addition, when considering different phases of the holding period, this study finds a markedly increased CEO turnover in the first year, in line with previous studies (e.g. Acharya et al., 2012). In contrast to previous studies, CEO turnover ahead of the exit is examined and found to be discernably low. These findings are underlined when compared to the analogous OPE sub-sample to control for exogenous factors. Hence, different transition stages across the PE investment horizon seem to warrant different measures in managing CEO turnover from an investor point of view.

The assessment of OPE-backed firms in this study adds to the sparse literature on CEO turnover in small and medium-sized enterprises (SMEs). Curiously, the observed CEO turnover in the OPE sub-sample (38.7%) exceeds that previously attested for private firms. For instance, Lausten

(2002) observes 31.7% turnover in comparable Danish companies. Gao and Li (2015) find only 7.9% in large private companies in the US. In addition, the OPE sample adds a crucial frame of reference when examining CEO turnover in comparable PE-backed companies. The difference in CEO turnover between the two sub-samples denoted beforehand is found to be highly significant, even after accounting for retirement age and a wide range of control variables. This finding substantiates the observed difference and by extension illustrates that CEO turnover, be it voluntary or involuntary, is a common situation Private Equity investors face and must manage to ensure the characteristically high returns of the asset class. Lastly, contrasting the two sub-samples highlights that PE-backed companies, regardless to the CEO turnover condition, exhibit superior financial performance. This is line with testaments in academia that PE investors tend to invest in firms with exceptional financial performance profiles (e.g. Kaplan, 1989; Kaplan & Strömberg, 2009). Taken together, the results of this study suggest that investing in PCBOs commands great and multifaceted demand for active CEO turnover management. At the same time, buyout funds naturally differ in organizational capacity and experience required to meet these demands, ever more increasing the importance of the issue in practice.

The remainder of this study is organized as follows. Section 2 summarizes quintessential previous literature and thereby more extensively highlights the contributions this study sets out to make to the existing literature. In addition, the section establishes systematic connections between analysis as well as interpretation in this study and the investment process in practice. Section 3 describes the sample design and selected characteristics that are pivotal to both the ensuing analysis and its interpretation. Subsequently, section 4 puts forth the methodology underpinning the analysis. Section 5 comprises analysis and discussion, structured along the Private Equity investment process. Thereafter, section 6 illustrates key limitations as well as potential areas for future research and the final section concludes this study.

2. Background

The ensuing section motivates and substantiates the scope and structure of the analysis in this study. It is structured as follows. Firstly, essential previous literature examining CEO turnover, particularly in buyouts, but also other ownership contexts, is delineated. The illustration is focused both on depicting the current progression of academia and the explicit as well as implicit expanses

yet to be investigated. Secondly, a brief overview of selected characteristics of the PE investment process in practice is given. The overview is not meant to give a rudimentary introduction to Private Equity per se, but to provide a conceivable frame of reference, grounded in the reality of practice, and guide the subsequent analysis.

2.1. Place in the literature

The depth and breadth of existing studies on CEO turnover is arguably a function of data availability. Consequently, a clear majority of research on CEO turnover focuses on companies in the public markets, followed by studies on large private-, PE-backed- and small private companies. While factors beyond mere data availability, such as interest in the academic community or generalizability of results are conceivable, the evident, steep hierarchy of attention in the literature is astonishing. Notably, data availability is not used plainly as a synonym for limited data collection effort, it is first and foremost the consequence of restrictions imposed by public disclosure requirements. For example, private companies in the United States are only required to file financial reports when they have more than 500 common shareholders (Tracy & MacChesney, 1933). In contrast, Swedish private companies are subject to wide ranging disclosure requirements, such as all limited liability companies being required to file financial reports annually (Bolagsverket, 2014). The role of public disclosure requirements and publically available information in general in this study will be further substantiated in section 3.1. The remainder of this sub-section firstly sets forth a concise buyout nomenclature. Subsequently, the existing body of CEO turnover research on LBOs is presented. Thereafter, selected areas academia has till date not elucidated and which this study aims to contribute to are recapitulated. Finally, findings from CEO turnover studies on private- and public companies are supplemented. Table I provides an overview of selected previous literature.

Table I**CEO turnover in the literature**

This table summarizes CEO turnover rates and selected sample characteristics of key literature on CEO turnover in Private Equity, private- and publicly traded companies. Turnover rates from this study are presented as means of comparison and are not adjusted for retirement to increase comparability. The private company buyout (PCBO) category relates to Private Equity backed buyouts broadly, as opposed to public-to-private (P2P) transactions exclusively. The firm size categorization is performed qualitatively given multifaceted differences in study- and sample designs.

Sample	Firm size	Rate	Geography	Time frame	Period	Reference
PCBO	Small	66.1%	Sweden	Holding period	1999-2018	This study
PCBO	Small	40.6%	E. Europe	Observation period	1993-2005	Cornelli, Kominek & Ljungqvist (2013)
PCBO	Small	32.0%	Finland	Entry + 1 year	2006-2016	Räisänen (2017)
PCBO	Large	69.0%	UK	Holding period	1996-2004	Acharya and Kehoe (2008)
P2P	Large	61.2%	UK	Various	1998-2003	Cornelli and Karakas (2015)
P2P	Large	51.0%	US	Entry + 2 year	1990-2006	Gong and Wu (2011)
P2P	Large	37.2%	US	Entry + 1 year	1990-2006	Guo, Hotchkiss and Song (2011)
Private	Small	38.7%	Sweden	Observation period	1999-2018	This study
Private	Small	31.7%	Denmark	Observation period	1992–1995	Lausten (2002)
Private	Large	7.9%	US	Observation period	2001-2011	Gao, Harford and Li (2017)
Private	Large	8.1%	US	Observation period	1993-1997	Coles, Lemmon & Naveen (2003)
Public	Small	14.4%	UK	Observation period	1985–1992	Conyon & Nicolitsas (1998)
Public	Large	9.0%	US	Observation period	1985-1997	Farrell & Whidbee (2003)
Public	Large	9.6%	US	Observation period	1993-1998	Fee & Hadlock (2004)
Public	Large	9.6%	US	Observation period	2001-2011	Gao, Harford and Li (2017)
Public	Large	11.5%	US	Observation period	1993-1997	Coles, Lemmon & Naveen (2003)

While the literature is often inconsistent in classifying buyout sub-classes (cf. Goossens, Manigart, & Meuleman, 2008; Wood & Wright, 2009), this study employs the following simple but clearly defined nomenclature. Hereinafter, the terms LBO and buyout are used interchangeably and refer to all transactions which financial investors underwrite as majority investors. Private company buyout (PCBO) and public-to-private (P2P) constitute sub-classes. PCBOs refer to all LBOs that are not P2Ps. In view of the clear sample delimitation used in this study, a more granular nomenclature is not deemed necessary.

Previous literature on CEO turnover in buyouts is relatively scarce, thinning further when distinguishing studies focusing on- rather than peripherally covering the topic. The core literature focusing directly on LBO CEO turnover is coined by a theoretical foundation in agency theory. Gong and Wu (2011) use a sizable sample of P2Ps in the US to examine whether proxies for agency problems affect CEO turnover, but only examine two years following the transaction. The authors find high CEO turnover (51.0% within the first two years) and significant associations with common proxies for high agency cost (cf. Jensen, 1986) ex-ante the acquisition. Specifically,

low leverage and high levels of undistributed free cash flow are shown to exhibit a positive association with CEO turnover. Further, they find that CEO turnover in their sample is positively associated with CEO tenure and negatively with pre-LBO return on assets. The short observation period and absence of subsequent financial performance assessment is attributed to data availability. Cornelli and Karakaş (2015) contrast CEO turnover in P2Ps following the entry of the investment (52.0%) with turnover over the remainder of the holding period (9.2%) and attribute the significant difference to reduced information asymmetry. Further, the authors find that CEO turnover post-transaction is significantly less sensitive to performance, which they attribute to more effective monitoring by the PE owners over a longer horizon. Moreover, the complexity of a firm's business, defined as degree of outside directorship prior to P2P, is found to be positively associated with CEO turnover, even after the P2P transition. The only existing study mainly focusing on CEO turnover in PCBOs, with the exception of a Master thesis (Räisänen, 2017), is Cornelli et al. (2013). The authors examine how board information in PE-backed companies in Eastern Europe impacts CEO evaluation and turnover. Well-incentivized and informed PE-boards are found to monitor effectively, i.e. prompt CEO turnover based on merit rather than bad luck or external shocks (40.6% across observation period). Interestingly, forced or involuntary CEO turnover is found to be associated with performance improvements. As highlighted beforehand, Räisänen (2017) cannot strictly be considered academic research. Nonetheless, the examined sample shares various parameters with this study, e.g. focus on PCBOs, broader geography, recent data, etc. Many of these parameters cannot be found in other previous literature. Notably, Räisänen (2017) in large parts tests findings from Gong and Wu (2011) in the context Finnish PCBOs, using an even narrower observation period of only one year post-entry. The author attests a relatively low turnover rate (32.0%) that is positively related to both experience of the PE firm and availability of credit. In contrast to Gong and Wu (2011), no evidence of agency cost affecting CEO turnover is found. It should be noted that Gong and Wu (2011) do not consider PCBOs in their study for three reasons. These reasons arguably have limited or no traction in general and especially the context of this thesis. Firstly, the authors argue that if PE firms were to believe incumbent management teams are incapable or severe agency problems prevail ex-ante, they would not invest in these PCBOs in the first place. However, there is evidence that PE investors deem the fundamental business more important than the management team (Siegel, Wright, and Filatotchev (2010)). Similarly, Kaplan, Sensoy, and Strömberg (2009) find that while management

is important, venture capital-focused PE investors often do find replacements and successfully exit their investment. Rogers et al. (2002) even argue that the incumbent CEO is rarely considered the right person to lead the acquired firm going forward. Moreover, Smart (1999) finds that venture capital-focused PE investors use a variety of tools and a non-uniform set of management assessments, contesting investor ability to identify unsuitable management ex-ante. Secondly, Gong and Wu (2011) reason that if PE firms discover that an incumbent CEO is unsuitable ex-post, it might be difficult to replace that CEO. This is a valid argument especially for PCBOs at the lower end of the SME spectrum, given a presumed scarcity of adequate executives. This presumption is in line with Gabaix and Landier (2008), who attest a scarcity of CEO talent and a consequent concentration of talented CEOs in large, well-paying firms. However, the predicated limitation is also a potential source of value creation for PE investors and thus of relevance for academia. Lastly, the authors emphasize that board composition differs between PE sponsored P2Ps and PCBOs. In PE sponsored P2Ps, individuals employed by PE firms replace outside directors, while management replaces outside directors in PCBOs. This governance aspect, while significant in the United States, is not relevant in the jurisdiction examined in this study. P2Ps are regularly motivated by poor governance, often in the form of management issues. These transactions are arguably predisposed to management turnover. In sum, PCBOs should be a meaningful and at present understudied area of CEO turnover research.

The non-core literature includes studies examining LBOs but with a focal other than CEO turnover. Acharya et al. (2012) decompose the returns generated by a set of mature PE firms in the UK. The authors identify inter alia active ownership, including CEO turnover, as a significant contributor to excess returns. Further, they find high turnover rates (69% across the holding period; 39% within the first 100 days) in their sample of large LBOs, interestingly mainly PCBOs. Guo et al. (2011) similarly set out to distinguish relative return drivers. They examine CEO turnover in P2Ps in the first year of the buyout only (37.2%) and find a positive association between early CEO turnover and gains in operating cash flow. This is in line with Cornelli et al. (2013) and their findings regarding performance improvements.

To recapitulate, previous research on CEO turnover in LBOs till date examined only a narrow portion of the buyout landscape, often within a narrowly confined timeframe. Again, the current state of academia is presumably in part attributable to data availability. This study expands the existing body of research in a threefold manner. Firstly, it adds an extensive examination to

the very sparse body of literature on CEO turnover in PCBOs. Secondly, it examines the entire holding period of the PE investments with respect to CEO turnover, while previous studies have focused on incomplete intervals such as the entry phase. While Acharya et al. (2012) discuss CEO turnover across the entire holding period as well, they side note it descriptively rather than analyze it. The scope of this study on the other hand allows for an assessment of the value creation portion of PE investments and thus potentially new insights into the same process. Lastly and arguably most importantly, this study is presumed to be the first to assess differences in CEO turnover and related aspects between PCBOs and comparable private (OPE) companies. Previous studies paralleled CEO turnover with other ownership types, mainly public companies and P2Ps (Cornelli & Karakaş, 2015) or large private ones (Coles, Lemmon, & Naveen, 2003; Gao & Li, 2015). It should also be noted that this study is distinct from the core previous literature on CEO turnover in LBOs in not focusing on traditional agency theory. The rationale is plainly that agency problems evolving around the separation of ownership and control should be more relevant to studies on P2Ps. Agency cost often arise from dispersed ownership (Jensen & Meckling, 1976) and are thus evident in P2P firms ex-ante the buyout. Naturally, and also underlined by the findings of Räsänen (2017), these agency theory dimensions are deemed less relevant for this study. Beyond the three main contributions, this study focuses on a distinct geography and time period no previous study has examined, potentially unfolding additional differences to previous work. Finally, in contrast to CEO turnover studies on LBOs and especially public companies, the private company and particularly OPE-backed SME space has received limited attention thus far. The remainder of this section gives an overview of research on CEO turnover in companies with non-PE owners, i.e. public and OPE-backed firms.

The literature on CEO turnover in public companies is the most elaborated strand of theory with respect to both breadth and depth, compared to other forms of ownership. Therefore, and given the only adjacent character of the public markets strand of CEO turnover theory, only an illustrative portion of that existing research is presented here. Farrell and Whidbee (2003) examine CEO turnover in light of market (performance-) expectations. The authors find that negative deviation from expectation, rather than poor performance per se, determines CEO turnover (9.0%) in the public companies studied. Fee and Hadlock (2004) find a similar rate in their sample (9.6%) when studying top management teams in public companies. They attest that while top management is evaluated at least partially as a team, aggregate firm performance is a less informative signal of

ability for executives other than the CEO. Examining the pay-performance relationship in a rare study on smaller public companies, Conyon and Nicolitsas (1998) observe a fairly high turnover rate (14.4%) compared to other public firm studies. Additionally, their finding suggest that bad performance is reflected in removal of the CEO rather than changes in pay. Taking another approach, Lehn and Zhao (2006) examine the relation between the market returns of acquisitive public companies and the probability of CEO turnover on the part of the acquirer. The authors find that 47% of CEOs who have made an acquisition are replaced within 5 years of the takeover, a rate evidently far in excess of other studies on public firm CEO turnover.

Studies on CEO turnover in privately held small and medium-sized enterprises (SMEs) are rare. This may once more be attributable to data availability, but potentially also a general lack of attention in academia. In one of these rare studies, Lausten (2002) examines the relationship between CEO turnover and corporate performance in Danish firms. Notably, the author does not set out to study SMEs exclusively but rather focuses on the same (only 7% listed companies in sample). Financial performance is found to be negatively associated with CEO turnover (31.7% rate). Moreover, evidence of the association weakening when the CEO acquires power through family ties is delineated. Most other studies covering private firms focus on large private firms and compare the CEO turnover to public firms. Gao and Li (2015) compare the turnover-performance sensitivity in public and large private firms. They find that CEO turnover in public firms is higher (9.63% public-, 7.94% private firms) and more sensitive to performance. This sensitivity is attributed to stock market investor myopia. Similarly, Coles et al. (2003) find turnover in public firms to be higher than large private ones (11.50% and 8.07% turnover / firm-years, respectively). The authors attribute this difference in part to the prevalence of founder CEOs in the set of private companies. Strikingly, CEO turnover in large private companies appears to be lower than in public companies. The findings from studies on LBOs, as well as those for small public and Danish private companies would arguably advise a different intuition.

It should be noted that the turnover rates observed in previous research (see Table I) serve merely as frame of reference. The studies examine samples differ beyond ownership type (e.g. with respect to study period, geography, length of observation period, etc.) and in exceptional cases also measure CEO turnover differently. Nonetheless, the narrow spread of turnover rates within the different study types (see Appendix I for a graphical representation) underlines that they provide a good reference for CEO turnover in the context of this study.

2.2. Place in practice

The preceding sub-section emphasizes that previous literature on CEO turnover in buyouts is noticeably skewed towards examining entry and early holding period studies (4 out of 6 LBO studies discussed in 2.1). Naturally, economic value creation, precluding certainly influential factors such as market timing or information asymmetries (Kaplan & Strömberg, 2009), occurs largely over the holding period as a whole. To adequately present the entire value creation period in Private Equity investments, particularly in light of CEO turnover, this study deploys a simplified portrayal of the investment process in practice to sensibly guide the analysis. This sub-section delineates that investment process.

In accord with the focal of this study, the investment process outlined in the following is intentionally demarcated widely to accommodate the CEO turnover analysis and most closely resembles that of a classical closed-end buyout fund. Buyout firms typically invest in 10 to 20 companies via each closed-end fund they manage (Froud & Williams, 2007). This investment process can be segregated into entry, holding period and exit. Investment and divestment upon entry and exit, generally span only a few months, though the time intensity can vary broadly, depending on the situation. Holding periods for buyout fund investments are usually four to six years long and tend to fluctuate with the broader economic environment. Kaplan and Strömberg (2009) examine leveraged buyouts globally between 1970 and 2007, and find that 51% of buyouts are exited within six years. Recently, median holding periods in global buyouts have decreased from an elevated post-financial crisis level of 5.9 years in 2014 to 4.5 years in 2018 (Bain & Company, 2019). Entry phase, holding period and exit phase are element of every LBO and motivate different analyses with respect to CEO turnover. The entry phase most naturally prompts the analysis of CEO turnover at the beginning of the investment period. This is a theme shared with the majority of previous literature. In addition, dimensions such as the type of fund entering into the investment or the type of management situation faced at entry, e.g. acquiring the company together with existing or with an entirely new management team, could have implications for CEO turnover. The holding period and its conclusion in an exit, propound investigations related to how and to what extent PE firms may manage their investments. Borrowing from Kaplan and Strömberg (2009), buyout firms apply three sets of value creation measures to the companies they acquire, namely financial-, governance- and operational engineering. In the context of CEO turnover, observable engineering levers may include inter alia management participation

structuring (financial and governance engineering) or management replacement post-entry and buy-and-build activity, i.e. M&A on the part of the acquired company (operational engineering). Further, aspects clearly attributable to the exit phase, such as the type of buyer the investment is divested to, could be intertwined with CEO turnover. Separating the investment process into different stages and sub-dimension is meant to augment a practical context to the analysis in this study. Most dimensions outlined in the preceding are explicitly not mutually exclusive and clearly demarcated, but rather tie into each other fluidly. The outlined investment process will be dissected in greater detail as guidance of the analysis this study sets out to contribute.

3. Sample

The preceding exposition of previous literature accentuates the importance of data availability in CEO turnover research. The implicit restrictions data scarcity imposes on researchable territory is arguably all the more pronounced in the PCBO niche. By extension, this study is propelled by its unique underlying data set. Hence, the sample delimitation- as well as data collection procedure warrant particular attention. This section will first illuminate and, more critically, motivate imperative aspects of sample design and selection. Subsequently, key sample characteristics in relation to their role for this study will be outlined.

3.1. Sample design and selection

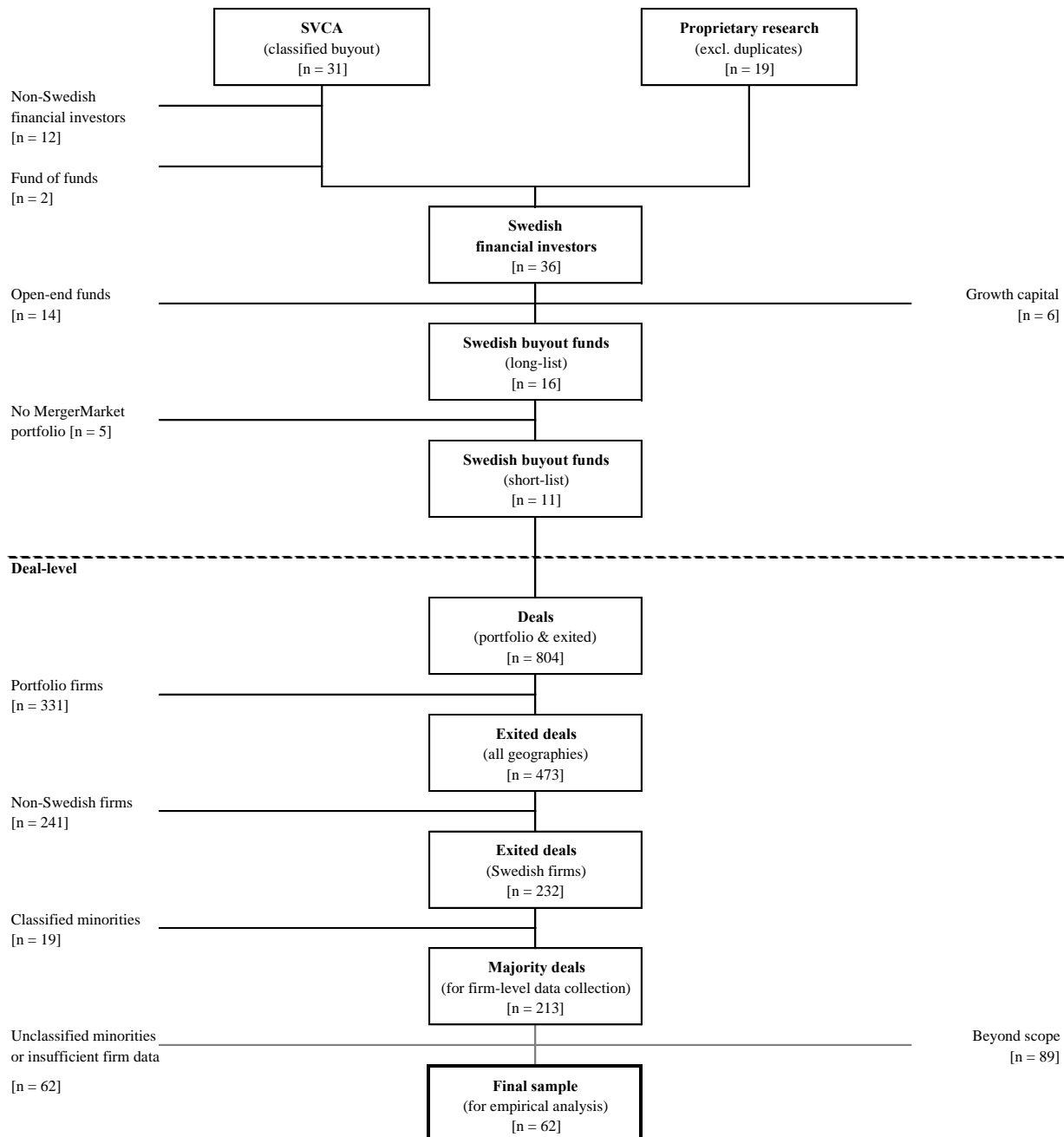
Several comprehensive delimiters of the sample constructed and collected for this study are motivated by aspects arguably neglected thus far in the existing academic literature. The three possibly most important sample delimiters are analogous to the three contributions to the existing literature outlined in the preceding section. First, the concentration on PCBOs, second, the distinct exploration of the entire holding period and third, the comparison of PE- with equivalent OPE-backed firms. The three delimiters give rise to other, defining demarcations for the sample at hand. Firstly, the focus on PCBOs starkly narrows the geographic scope from a data collection point of view. Moreover, CEO age is naturally a pivotal control variable when studying CEO turnover (Gong & Wu, 2011). While this aspect may not be an impediment for studies on public and large private companies, as well as to some extent P2Ps, it generally is for PCBOs. PCBOs usually evolve around SMEs with executives that have a negligible public profile. Hence, Sweden, a

country with exceptional personal data transparency (Sewall, 2018), is presumably one of few countries that allows for reliable identification of private persons' age and therefore for a study of this type. In addition, Sweden requires even small limited liability companies to file statutory accounts including inter alia detailed financial information (Bolagsverket, 2014), ensuring data availability beyond mere CEO turnover. Secondly, the decision to examine an elapsed buyout holding period prompts centering the study around exited investments backed by closed-end buyout funds. Closed- and open-end buyout funds by nature have different investment horizons and by extension different value creation timelines. Closed-end funds are presumed to face more time pressure in the value creation stage and thus undertake value creation measures such as governance engineering by means of management turnover in a more distinct manner. By excluding open-end funds, the observed relations should theoretically allow for less noisy inferences. Moreover, as this study aims to assess the active development of portfolio companies over the holding period, quick flips, i.e. LBOs exited within 24 months of entry (Kaplan & Strömberg, 2009), are precluded from the data collection. Additionally, statutory accounts prior to 1999/2000 cannot be retrieved from standard digital data bases. Therefore, the sample only includes investments entered into between 1999 and January 2017 (as the data collection commenced February 2019 and quick flips are precluded). Lastly, the comparison with equivalent OPE-backed firms renders a restriction to one geography or jurisdiction virtually inevitable. This restriction is attributable to the prerequisite of having comparable and available data. For example, industry classification and financial accounting standards must be consistent to facilitate the matching of PE and OPE observations. The delimitation outlined thus far implies, in part, limitation with respect to generalizability of results. Ultimately, this study, alike the previous literature, trades off the benefits of a coherent and comprehensive data set, against tolerable and natural limitations. These aspects will be discussed in detail in section 6. In the remainder of this section, the sample selection concept for the PE sample, an international control group and the OPE control group will be introduced consecutively. The data collection process will be contoured in an interposition subsequent to the PE sample delimitation.

Figure I
PE sample delimitation process

This figure summarizes the delimitation of the PE-exit sample underpinning this study. The sample includes LBO exit transactions between 1997 and 2019. Notably, collating the 804 deals (portfolio & exit) identified in the Swedish buyout funds selection with single-source transaction data bases demonstrates sufficient representativeness of the Swedish LBO buyout segment. Particularly, this starting sample of deals represents 93% of Swedish deals identified using Capital IQ (n = 863) and 57% of Nordic deals using Prequin (n = 1,404) for all financial sponsors otherwise applying the same search parameters. The sample is compiled and delimited using a variety of sources including but not limited to SVCA, MergerMarket, Capital IQ, Retriever and Amadeus.

Investor-level



The PE sample selection rationales motivated in the following are naturally decisive for the subsequent delimitation of the OPE sample, in addition to a control group containing international PE funds. Shared demarcating aspects may not be reiterated. The PE sample selection can be separated into investor- and deal-level (Figure I). Since the PE sample is coined by M&A events, it is crucial to chronologically mark the commencement of the investor-level data collection, i.e. February 1st, 2019. The original pooled investor sample contains 50 firms. Excluding non-Swedish firms (12) and indirect investors or fund-of-funds (2) subsequently reduces it to 36 Swedish financial investors. The concentration on Swedish investors renders the sample in many aspects homogenous, e.g. with respect to governing law or cultural characteristics. This is presumed to allow for more distinct inferences on variables such as investor experience or investment focus. In order to control inter alia for a potential country-bias, an international PE firm control group is examined as well. Subsequently, as motivated at the outset of this section, open-end or evergreen- (14) as well as growth capital (6) funds were excluded, resulting in a long-list of 16 Swedish buyout funds (the terms buyout / PE fund and firm are used interchangeably). The exclusion of 5 Swedish buyout funds that are not included with portfolio overviews on MergerMarket mark the final delimitation step on investor-level. This exclusion is primarily practically motivated, because MergerMarket is arguably the leading M&A intelligence provider and therefore the logical base layer of data for this study. Moreover, it adds to the coherence of the data set by utilizing of a single data source. The 5 buyout funds excluded are smaller and / or maiden funds with limited track record and few if any exit events (e.g. Summa Equity with one exit or Mimir Invest with no exit at all). Thus, by means of exclusion, this study makes inferences among established buyout funds. The sample of 11 Swedish buyout funds (Table II) comprises a total of 75 fund vehicles commanding approximately EUR 92 billion in capital commitments and a total of 804 transactions between 1997 and 2019. Notably, the aforementioned restriction to 1999-2017 is derived on deal-level due to the focus on exited investments with available financial performance data.

Table II**Swedish buyout fund sample**

This table summarizes the 11 buyout funds resulting from the investor-level sample delimitation (see also Figure I). Funds raised in Swedish Krona or US Dollar were converted to Euro at spot rate on date of fund launch (applies to 19 out of 75). Triton Partners is not unambiguously of Swedish decent, but has both Swedish and German heritage (Tagesspiegel (2010)).

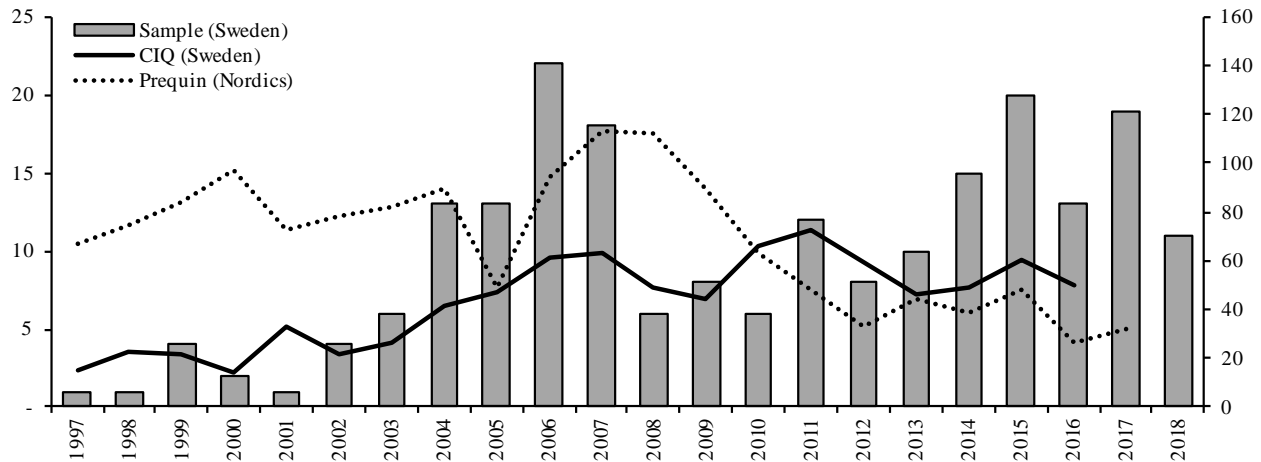
Buyout firm name	Foundation	No. of funds raised	Capital raised (mEUR)	Total deals	Portfolio firms	Exited firms	<i>of which Swedish</i>
Accent Equity Partners	1994	6	1,780	68	21	47	41
Adelis Equity Partners	2012	2	1,020	21	18	3	-
Alder	2010	2	120	10	6	4	3
Altor Equity Partners	2003	5	8,300	68	34	34	10
EQT Partners	1994	19	38,055	208	89	119	34
IK Investment Partners	1989	10	9,810	124	43	81	21
Litorina Capital Advisors	1998	5	847	38	14	24	24
Nordic Capital	1989	9	16,775	98	38	60	31
Priveq Investment	1998	5	691	41	15	26	25
Segulah Advisor	1994	5	1,201	46	13	33	29
Triton Partners	1997	7	13,194	82	40	42	14
Total		75	91,792	804	331	473	232

The 804 transactions constitute the basis for the deal-level sample delimitation. Markedly, these transactions include duplicates such as co-investments or recurring PE-ownership cases, e.g. secondary buyouts (SBO), tertiary buyouts (TBO), etc. Acquisitions by PE-backed companies are not included in this sample but are examined separately. The set of transactions backed by the 11 buyout funds in focus here, accounts for a representative portion of the relevant transaction population. Specifically, the set of transactions represents 93.2% of Swedish LBO deals identified using Capital IQ ($n = 863$) and further, 57.3% of Nordic buyout deals using Prequin ($n = 1,404$) for all financial sponsors and otherwise applying the same search parameters[‡]. This study focuses on exited deals in Sweden, requiring the elimination of firms still held in the respective portfolios (331) and exits by non-Swedish firms (241) from the sample. After excluding exits classified as minority transactions (19), a markedly depleted set of 213 exits remains. Measuring this preliminary sample once more against the PE transaction databases of Capital IQ and Prequin illustrates that it is satisfactorily distributed over time, in line with the broader market (Figure II).

[‡] The authors would like to thank Per Strömberg for providing the data sets in reference. All errors remain the authors'.

Figure II
Preliminary PE-sample distribution

This figure illustrates relative deal activity in the preliminary PE exit sample ($n = 213$) vis-à-vis the broader PE deal activity in Sweden (Capital IQ) and the Nordics (Prequin). Notably, the transaction databases benchmarked include investments this study does not deem LBOs, financial investors that are not buyout funds (by the nomenclature of this study) and most importantly investments that have not been exited by the current investor. Hence, the comparison is indicative in nature. Benchmarks (line graphs) are scaled to the secondary axis.



The final PE sample ($n = 62$) for analysis is derived by means of comprehensive and vastly manual data collection. Of the preliminary sample (213) a large portion of observations (62) is excluded either because they were identified as minority investments (though not noted on MergerMarket) during the data collection process and for a lack of reliable (financial) firm-level data. Finally, 89 observations were not examined due to the substantial data collection effort characterizing this sample. The preliminary sample of 213 observations is considered a close approximation of the population of interest in this study, given the sample parameters outlined thus far. By extension, the 62 observations in the final sample constitute roughly half of the population with sufficient data for analysis and should thus be satisfactorily representative. Moreover, the previous CEO turnover literature relies on readily available, largely prefabricated data sets, often deemed as a limitation. In contrast, this study also contributes to existing research by producing a unique data set involving immensely time-intensive manual data collection. The data collection process is analogously demanding for international peers, but marginally less complex for OPE-backed firms, due to usually persistent ownership structures. To conclude, the PE exit sample selection procedure yields a 62 observations sample with 58 firms (due to recurring PE ownership). A detailed list can be found in Appendix II.

Given the exploratory approach of this study, a broad array of data points was collected, largely manually from statutory accounts. Compared to the previous literature, the breadth and depth of data used in this study is more extensive. For example, this study contains data for up to ten years in holding period length per firm observation, while Gong and Wu (2011) only examine two years within entry, Guo et al. (2011) and Räisänen (2017) even only one year. The collected information spans four categories: CEO-related-, transaction-related-, other company- and financial performance information. CEO-related information for the holding period as well as ex-ante and ex-post the buyout includes CEO name, date of birth, tenure start and -end date. Transaction-related information encompasses owner identity during, ex-post and -ante the buyout, entry- and exit date, ownership stake and buyout type related to the PE-acquisition, as well as seller type and CEO relation (founder / family CEO ex-ante), number of add-on / buy-&-build transactions executed over holding period. Other company information comprises industry classification and date of incorporation. Financial performance information collected contains, to the extent available, net sales and EBIT during holding period as well as total assets at acquisition.

The scope of financial performance metrics for data collection is broadly in line with the literature. This study relies on net sales as common financial performance indicator. In contrast, total revenue is subject to distortions from reporting and industry inconsistencies (e.g. other income, changes in inventory, capitalized work on own account, etc). The use of EBIT as profit metric is motivated by the fact that it captures capital-intensity over time and should thus be a better proxy for cash flow (approximates EBITDA less capital expenditures over time) and hence investment return. In contrast to Gong and Wu (2011) and Räisänen (2017) this study does not examine leverage, primarily because it cannot be assessed reliably due to tax- and securitization structuring across different levels of the acquisition structure. Studies measuring leverage reliably rely on data sources that are not readily accessible, e.g. syndicated loan market information (Axelson, Jenkinson, Strömberg, & Weisbach, 2013). Moreover, as elaborated in the previous literature section, this study does not set out to examine agency theory in particular and is hence not critically contingent on leverage as a proxy for agency cost. Lastly, return on assets as an additional profit metric (Gong & Wu, 2011) was discarded after data collection for an initial PE sample. The exclusion is motivated by inconsistent or non-recurring distortions in EBIE from other (financial) income, a key part of the return on asset measure.

As noted above, collecting data for even a single exit observation constitutes an immensely time-intensive, mostly manual process. Required data must be collected from a variety of sources (detailed list in Appendix III), e.g. former management information from Amadeus, CEO age from solidinfo and SNI-industry classification from Retriever. In addition, obtaining financial performance data from statutory accounts is particularly cumbersome for PE-backed firms. The two main reasons are the prevalence of fairly complex acquisition or holding structures and broken financial years due to the arbitrary scatter of acquisition events across financial years. The use of the former is motivated, from an investor point of view, inter alia by tax efficiency and capital structure considerations. Acquisition or holding structures may also be altered during the holding period. Consequently, an average PE exit observation requires the examination of 10-30 statutory accounts from 2-3 holding companies and 1-2 operating companies (to identify now inactive holding companies). Moreover, a large part of observations contains financial information with broken or varying financial reporting years that needs to be annualized. This is a common impediment in studies examining the financial metrics of PE-backed companies.

While this study, as the entirety of discussed previous literature in the PE niche, concentrates on investments and investment firms from a single geography, it also examines a sample of international buyout firms and their exits in Sweden. Previous studies have either focused on local PE firms (Acharya et al., 2012; Räisänen, 2017) or not heeded potential investor differences at all. To fill this gap in the literature, this study composes a control group based on 15 exits by 8 renowned Anglo-Saxon funds such as Kohlberg Kravis Roberts or The Carlyle Group (Appendix IV). The choice of Anglo-Saxony as geographic origin is primarily motivated by the presumption that if differences in relation to CEO turnover were to exist between buyout firms of divergent origin, it should be starker when matching Swedish PE firms with Anglo-Saxon, rather than Nordic peers. Additionally, such a comparison group should allow to control for differences such as investment firm size and experience of the buyout firm. Räisänen (2017) finds a weak but statistically significant association between experience, measured by transactions executed, and CEO turnover. These characteristics and potential differences will be discussed in the ensuing analysis. Further, the focus on exceptionally large international funds is grounded in the notion that the Swedish PE industry is arguably a mature one with a strong presence of domestic buyout firms (Næss-Schmidt, Heebøll, & Karlsson, 2017). Hence, large international funds with longer track-records should be relevant competition. The international buyouts firms were, alike the

Swedish PE firms in the main PE sample, identified using information provided by the Swedish Venture Capital Association (SVCA), supplemented with proprietary research. The subsequent sample delimitation and data collection process is analogous to main PE sample.

The primary comparison group for the PE sample, i.e. the OPE sample, is intended to control for differences in CEO turnover potentially attributable to differences in owner type. This sub-sample was derived based on the exit observations in the PE sample rather than delimited in the top-down approach applied to the Swedish and international PE samples. Following Cornelli and Karakaş (2015), this study matches OPE firms based on industry and size. Equally imperative, ownership is assessed and represents the third main delimiter of the OPE sample. The industry matching draws on the Swedish SNI-industry classification collected for the PE sample. Matching firms are identified manually by means of the industry directory of the Retriever database. Other approaches prove unfeasible, due to a reform of the SNI-classification system in 2007 (SCB (n.a.)). This reform renders historical observations prior to 2007 from databases such as Serrano virtually impossible to map to the current classification in the PE sample. The SNI-classification system has five levels of industry detail, of which this study employs the most granular one to ensure a precise industry match. In addition, a qualitative judgement of the soundness of comparability is performed. The size matching relies on net sales, predominantly due to ease of identification within the database. As will be elaborated in the next section (3.2), EBIT is deemed the most suitable measure of relative firm size of the financial metrics collected. The precise matching based on industry should ensure reasonably contiguous profitability levels, justifying the deployment of net sales matching parameter. Out of the 62 companies to be assigned a control observation, adequate peers based on industry and size could be readily identified in all but 7 cases. For these exceptions, size-comparable companies in adjacent industries were selected based on qualitative judgement. Lastly, ownership must qualify as OPE, as defined by this study. Specifically, companies that are either publically listed / subsidiary to a public company, have been owned by a buyout firm or other type of financial investor before the end of the observation period, or are a green-field type subsidiary of a foreign company, public or private, are excluded. A green-field type subsidiary is defined as a straight expansion by a foreign company into Sweden, rather than the acquisition of a previously independent company with the same intention. In addition to these rigid ownership criteria, the matched sample is intentionally centred around founder / family owners (58% sample) and private investors (23%). The remainder is composed of private company parents (13%), that

are not excluded due to the aforementioned green-field criterion, and state ownership (6%). The exclusion criteria and focus on founder / family owners and private investors are deemed critical to ensure a reasonably uniform and, more importantly, complementary sample composition vis-à-vis the PE sample. The observation period for data collection is tied to the holding period of the corresponding observation in the PE sample. Firm-level data collection was performed analogously to the PE sample. The final OPE sample consists of 62 observations and 57 individual companies. Duplicates are largely attributable to recurring ownership in the PE sample. A detailed list of the OPE firms in the sample can be found in Appendix V.

3.2. Sample characteristics

The characteristics discussed in this sub-section inform the interpretation of the ensuing analysis and are generally descriptive statistics per definition. However, the statistics outlined in this section do not constitute direct basis for interpretation of CEO turnover. Descriptive statistics directed at CEO turnover inferences from the sample are proposed in detail in section 5. If not stated otherwise, the outlined characteristics refer to the main sample of Swedish PE- and OPE-backed companies, not the international control group. The remainder of this sub-section concentrates on a variety of attributes, inter alia sample size, firm years, industries and firm size within the sample.

Despite the significant data collection effort illustrated in the preceding sub-section, this study's sample size is well in accord with previous CEO turnover literature. The main sample contains 124 observations across 114 individual companies, half of which respectively attributable to the PE- and OPE sub-sample (Appendix VI). Gong and Wu (2011) in their study of CEO turnover examine 126 P2P LBOs, Räisänen (2017) studies 92 PCBOs, Cornelli and Karakaş (2015) 88 P2Ps and Acharya et al. (2012) only 66 LBOs. Cornelli et al. (2013) are the exception with a 473 observations sample, notably due to their unique access to a confidential data set from the European Bank for Reconstruction and Development. As a reference point for CEO- but not CEO turnover-related studies, Kaplan, Klebanov, and Sorensen (2012) examine CEO characteristics in a sample of 88 observations. Finally, as outlined in the preceding section, the argument can justly be made that the sample of this study, given the relative size of the population of interest, should be reasonably representative by design.

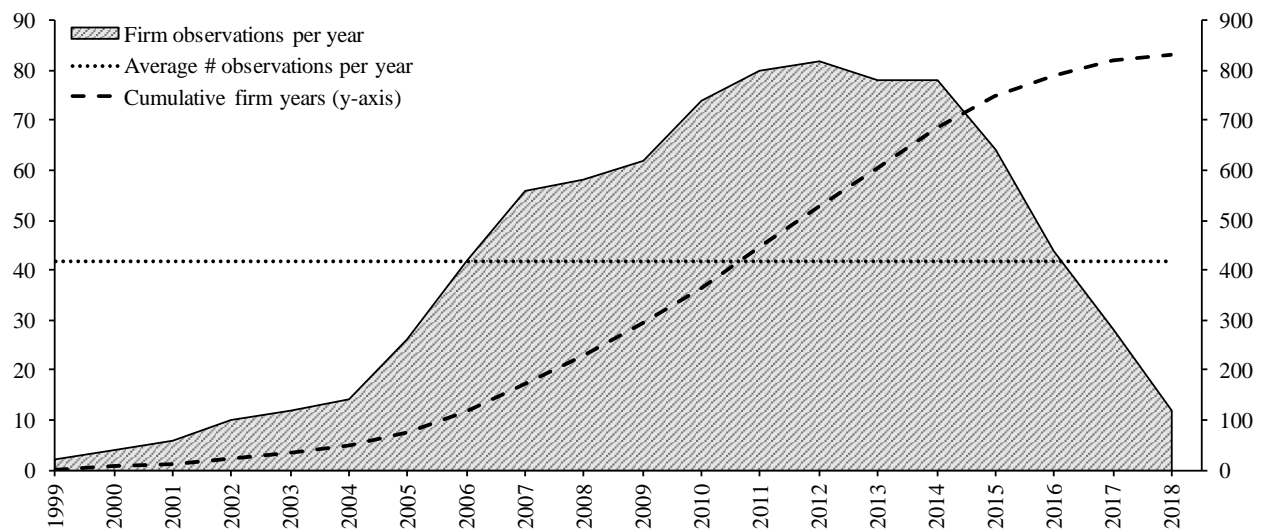
Since this study examines holding periods and matched observation periods, firm years, i.e. the cumulative number of years examined across the observations in the sample, are of interest.

Firm years are a better measure of the data substance and temporal dimension within than mere observations of transactions or firms. This sample contains 832 firm years in total, or 6.7 firm years per observation. Cornelli et al. (2013) examine 5.6 firm years per observation in their study. Figure III depicts the firm year observations over the study period. The hump shape of the distribution is attributable to an increase in PE market activity in general (Figure II) and the focus on exited investments (and the analogously delimited OPE peer horizon) in this study.

Figure III

Firm years / observations over time

This figure illustrates firm years or observations over time. The average denotes the cumulative firm year observations (832) in the sample at the end of the study period (February 2019 but no relevant exits past 2018) divided by the years studied (20).



The spectrum of notably represented industries, or rather industry types, in the sample is found to be quite narrow. Based on the SNI-industry classification underpinning the matching logic, the PE sample and therefore, with marginal differences, the OPE sample are unevenly distributed across industries (Appendix VII). The three most prominent industries based on aggregated SNI classification, represent 73% of all observations (124), with Manufacturing representing the largest share (38%), followed by Wholesale and Retail (27%) and Construction (8%). While the accumulation of observations in certain industries is common in the buyout industry, the SNI-classification representation may be skewed by its broad categorization. When turning to the MergerMarket classification, the distribution is less concentrated. The three most frequent industries represent 48% of the overall, composed of Industrial Products and Services (24%), Other Services (13%) and Construction (11%).

As noted in section 3.1, the OPE sample was inter alia collected with equivalent firm size as a main objective, in order to maximize comparability between the sub-samples. In contrast to Gong and Wu (2011), who rely on book value of assets to measure firm size, this study focuses on EBIT as main delimiter. The underlying choice logic is twofold. Firstly, asset book value is distinctly affected by different aspects of purchase price accounting, inflating original book values towards what is deemed fair value. Intuitively, firms in the PE sample should be subject to more M&A activity and thus asset revaluation, reducing book value comparability vis-à-vis the OPE sample. As previous studies examine PE-backed companies only, book value of assets is a more valid delimiter. Secondly, EBIT is more commonly used as financial metric underpinning firm valuation than net sales (Pearl & Rosenbaum, 2013), inter alia due to its proximity to cash flow. By extension it is deemed a superior measure of firm value. However, difference in profitability is a natural concern when using EBIT as size measure. This concern is deemed sufficiently alleviated by means of the careful industry-matching underpinning the sample. Firm size is measured at entry or beginning of the observation period to avoid bias from divergent development over the observation period. The relative firm size characteristics of the two main sub-samples of interest are coined by two main traits. Firstly, firms in the PE sample are substantially greater in size, with median EBIT in the OPE sample measuring to 42.9% of the PE sample (Appendix VIII). Secondly, there are great outliers in the size difference between the two samples, skewing relative firm size and motivating comparison based on medians which are less susceptible to outliers. The observed size disparity is attributable to the nature of the relation between firm size and ownership characteristics, rather than inadequate composition of the comparable group. Due to the PE sample parameters outlined in the preceding section, this study focuses on mature and large companies. Especially increased size prompts capital requirements public markets (Demsetz & Lehn, 1985) and PE are most suitable to satisfy. Hence by nature of company life cycles, the most comparable firms with respect to size are either publicly listed or PE-backed. Evidently, these ownership types are unsuitable for studies of this type. The international control group on the other hand exhibits reasonably comparable size vis-à-vis the Swedish PE sample. Specifically, median EBIT in the international PE sample measures to 119% of the corresponding figure in the Swedish PE sample.

As outlined in the preceding sub-section, CEO age, and relatedly retirement age, is a fundamental control variable in this study. Median CEO age at turnover in the PE sub-sample (53.4 years; average 53.0 years) and OPE sub-sample (53.8 years; average 54.1 years) differ

indiscernibly. The PE sample contains only one CEOs in retirement age when turnover occurs. The OPE sample on the other hand, encompasses 5 CEOs in retirement age.

In contrast, CEO gender is found to differ notably between the sub-samples. The Swedish PE sample exhibits a substantially lower share of female CEOs (0.7% across the observation period) than the OPE sample (12.2%). For comparison, Renstig and Westlin (2006) find that only 1% of CEOs in Swedish listed companies are women, while female CEOs are substantially more common (16%) in small businesses with 50 to 500 employees (Lagerberg, 2017). Therefore, while the differences in share of female CEOs is astonishing, it may in part be attributable to the difference in size between the PE- and the OPE sample. The international control group contains 3.4% female CEOs, similarly underlining the role of differences in firm size.

Whereas CEO turnover with respect to the holding or analogous OPE observation period will be discussed in depth in the ensuing analysis, CEO turnover across the entire timespan of this study is briefly depicted at this point. Two aspects are particularly noticeable when examining turnover across the study period. Firstly, CEO turnover is consistently higher in the PE sample. This will also be discussed in detail in later in this study. Secondly, the relatively higher turnover exhibits two distinct local maxima, in 2007 and 2011 (Appendix IX). One potential explanation is the high acquisition activity on the part of buyout funds at those two points in time as underlined by the PE-backed deal activity in the Swedish market (Figure II). The previous literature attests substantial turnover rates in the first year after entry (Guo et al., 2011; Räisänen, 2017). In conjunction, these two aspects presumably explain the peaks in turnover rates in 2007 and 2011.

4. Methodology

Considering the intended contributions of this study to expand the existing literature by means of inferences from a unique proprietary data set, its approach is evidently exploratory and inductive in nature (Holden & Lynch, 2004). Consequently, this study and its methodology in particular, are not focused on hypothesis generation based on previous literature. Nonetheless, the following variable definition is in part grounded in precedent research. This section first discusses the main relevant variables. Thereafter, the statistical methods applied in this study are outlined briefly, with a clear focus on regression analysis.

4.1. Variable definition

The majority of variables underlying the ensuing analysis is non-derivate, i.e. these variables are merely the collected data not warranting significant transformation. An exhaustive list of variables for analysis is presented in Appendix X, distinguishing regression-relevant-, i.e. dependent and independent, and other variables for descriptive and further inferential statistics. Notably, a substantial portion of the data and metrics, as well as the associated rationales, were introduced in depth in the preceding section on sample selection (3.1). This sub-section intends to add selected key rationales underlying the variables deployed in this study, rather than merely list the same holistically but without incremental elucidation.

In accord with the focal of this study, the key variables of interest are measures of CEO turnover. The turnover variables are critical for a substantial portion of both descriptive and inferential analysis. Moreover, they constitute the dependent variables in the regression analysis. Specifically, CEO turnover frequency and binary CEO turnover are examined. CEO turnover frequency denotes the cumulative number of turnover events during the holding or observation period, respectively. Binary CEO turnover indicates whether or not a PE- or matched OPE observation includes any CEO turnover event over the relevant period. The literature commonly focuses on CEO turnover frequency (Cornelli & Karakaş, 2015; Cornelli et al., 2013; Gong & Wu, 2011; Guo et al., 2011), examinations of binary CEO turnover are the exception (Räsänen, 2017). This study similarly focuses on frequency but assesses both measures to allow for inferences based on binary incidents that potentially warrant different conclusions. Directly related to the turnover variables, this study, in line with Gong and Wu (2011), controls for CEO age in order to account for retirement age effects. Since 1994, the minimum retirement age in Sweden is 61 years of age for flexible and 65 years for guaranteed pensions (Könberg, 2008). While reaching the age of 61 makes employees eligible for flexible or pro rata pensions, 65 is considered the regular retirement age. Since the actual reason for CEO turnover is not observable in the non-confidential type of data used in this study, retirement age is naturally critical to control for. Where feasible, potential effects of retirement are separately accounted for, but if not stated otherwise, CEO turnover variables are directly adjusted for retirement.

In line with previous literature on determinants of CEO turnover (viz. Jenter & Kanaan, 2015; Kaplan & Minton, 1994), this study also controls for broader market conditions in the regression analysis, as one factor of bad firm performance outside the control of management.

Given the size of the sample and considering the breadth of specific industries (53 industries per 62 observations in each sub-sample, based on SNI-5 classification, Appendix VI), this study does not control for industry performance. Instead, stock-market returns for the respective observation periods are employed as means of reflecting broader market conditions. Specifically, OMX30 return data (Nasdaq, 2019) is scaled to the periods examined, with specific beginning and end dates allocated to the closest trading day. Notably, while using the OMX30 may suggest a bias towards larger firms, the relevant smaller-company indices do not cover the entire period examined in this study. Moreover, the indices are presumed to exhibit high correlations.

The entirety of financial metrics outlined in the sample selection (3.1) is utilized as a variable sub-set in various portions of the analysis. In addition to these simple continuous variables, basic transformations into financial performance metrics are applied (Appendix X). Specifically, transformations into changes in profitability ratio (delta EBIT margin) and compounded annual growth rates (sales- and EBIT CAGR) are performed. The financial performance metrics are computed for the time period between financial year of entry and exit year, for the PE sample, and analogously for the equivalent observation period in the OPE sample. Financial data may be rendered not available or meaningful, e.g. due to unreliable financial data in broken financial years or off-shore acquisition vehicles. In order to substantially increase the observations with financial data and thus statistical power of the inferential analysis, these cases were adjusted using the subsequent (for entry or beginning of observations period) or preceding (for exit or end of period) financial year's data, if feasible. This approach marginally affects the representativeness of financial performance of holding or observation period performance. Nevertheless, it adds constructively to the substance of the sample. The outlined peripheral adjustments to the financial performance variables increase the number of observations of EBIT CAGR by 22 from 66 to 88. Notably, the adjustment is not performed on 22 but only 11 observations due to the matching mechanism. Financial data for the matched OPE observations is persistently available, but its utilization is contingent on availability of matched PE observations. Logically, this notable expansion of the sample (Appendix VI) also adds greatly to the body of firm years examined. Consequently, the adjustments in reference expand the basis for financial performance inferences drawn from in this study, despite being marginally approximate.

4.2. Statistical methods

Owing to the size of the sample but equally to the breadth of cross-sectional data underlying the analysis in this study, fundamental statistical analysis is employed to elicit inferences. Specifically, descriptive and inferential analysis, the latter in the form of t-tests and regression analysis, are applied to the data. The analysis is naturally segregated into within- and across-sample domains for the PE- and the OPE observations. In addition, the Swedish- and the international PE sample are juxtaposed to elicit potential differences. Moreover, to account for presumably non-normally distributed underlying data, especially with respect to the financial (performance) metrics, the relevant inferences are based on medians rather than averages (n.b. both metrics are considered) to omit results skewed by outliers. Given the reliance on rather fundamental statistical analysis, the remainder of this sub-section is confined to regression methodology and associated diagnostics.

The reason for employing regression analysis in this study of CEO turnover is threefold. Firstly, it enables a potentially deeper understanding of the relationships between CEO turnover and the factors represented by the defined independent variables. Secondly, it cross-validates the statistical significance of findings from the t-tests and relationships indicated by descriptive statistics. Thirdly, and arguably most importantly, it allows for the isolation of effects of the different independent variables on CEO turnover by means of multivariate regression models. For each independent variable in every regression model employed throughout this study, the following simple hypothesis test is utilized to draw inferences about the relationships between the independent and dependent variables.

H₀: $B_i = 0$, The coefficient relating to variable i is zero

H₁: $B_i \neq 0$, The coefficient relating to variable i is not zero

When employing regression models, this study aims to be as parsimonious as possible without sacrificing potential inference. Firstly, each of the defined independent variables is regressed against the defined dependent variables for CEO turnover in separate simple linear regressions in order to examine and elucidate the characteristics of their potential relationships. Secondly, multivariate regression models are constructed for each of the dependent variables. The results of simple linear regression, on their own, may be deceptive. The analyzed independent variable could be acting as a proxy for factors excluded from the model and identified relationships could

therefore prove fallacious. The use of multivariate analysis allows for the isolation of the effects of the independent variable as their relationships to the dependent variable can be simultaneously accounted for (Sharpe, De Veaux, & Velleman, 2012). Therefore, multivariate regressions including exhaustive sets of independent variables are employed.

Since this study utilizes regression models, it is vital to perform diagnostic tests to ensure reliability of results. As multivariate regressions are employed, it is necessary to ensure that the included variables do not show strong signs of multicollinearity. If present, a high degree of multicollinearity could affect the results, if the correlated variables are included in a regression model simultaneously (Farrar & Glauber, 1967). To test for multicollinearity, the variance inflation factor (VIF) and tolerance value of each included variable are analyzed. The VIF and the tolerance value are directly related to each other and both serve as indicators of collinearity or multicollinearity among the independent variables (Hair Jr, Sarstedt, Hopkins, & Kuppelwieser, 2014). The regressed variables do not exhibit significant signs of multicollinearity (Appendix XI), substantially undercutting the generally accepted threshold (O'Brien, 2007).

Further, the ordinary least squares regressions model requires that the residuals are homoscedastic and not serially correlated in order for its estimators to be the best linear unbiased estimators. The inferences from the regression analysis in this study rely on the observed p-values, which in turn rely on the observed t-statistics and critical t-values. The t-statistics are dependent on the standard errors of the estimated coefficients. In the presence of autocorrelation or heteroscedasticity, the standard errors of the estimated coefficients would no longer be unbiased (Newbold, Carlson, & Thorne, 2013). Thus, it is vital that any such issues are identified and, to the extent feasible, remedied. Auto- or serial correlation is no concern in this study, given that the data, at least that underpinning the regression analysis, is not a time series. Heteroscedasticity, however, must still be controlled for. Each regression is tested using a Breusch-Pagan test, which detects heteroscedasticity (Breusch & Pagan, 1979). When heteroscedasticity is detected, heteroscedasticity consistent standard errors, are calculated. By utilizing heteroscedasticity consistent standard errors to replace the ordinary least squares standard errors, unbiased standard errors are achieved and the issue of heteroscedasticity remedied (White, 1980).

5. Analysis and discussion

It should be noted at the outset, that this section conjoins different types of statistical analysis interchangeably, within and across sample domains, as well as related literature shedding additional light on the various analyses. Moreover, it chronologically follows the previously outlined investment process. This approach is arguably in part divergent from academic practice. However, it is chosen consciously, motivated by the exploratory examination of this unique data set, to elaborate the findings of this study in the most conceivable and hence instrumental manner. It should further be emphasized, that the data analyzed does not allow to infer whether a CEO deliberately departs or gets replaced by the owner. Accordingly, active and passive wording of CEO turnover in the following does not imply causation.

Overall the two sub-sample differ significantly with respect to CEO turnover. The PE sample exhibit turnover in 66.1% of observations, considerably more than 38.7% in the OPE sample (27.4% difference). This apparent gap widens further (33.9% difference) when excluding observations that contain turnover events with CEOs in retirement age. The nuances of these differences in CEO turnover, as well as potential causes and consequences will be discussed in the ensuing sub-sections.

5.1. Entry phase

In the investment process, the entry into an investment is a phase rather than a specific point in time. It includes due diligence that can last from anywhere between a few months to more than a year. It includes signing, i.e. the legally binding intent to acquire the firm, subject to various conditions, and closing, i.e. the date control is transferred between buyer and seller, which can similarly span a period of a few months to more than a year (Perry & Herd, 2004). Finally, it arguably also includes the first months or year under the new owner. This sub-section describes the role of CEO turnover in the entry phase of the observations constituting the PE sample. The resulting inferences are compared to OPE firms and related theory and practice.

When investigating CEO turnover in buyouts from an investment process point of view, a natural point of departure is management due diligence. However, this aspect cannot be illuminated using the publically accessible data examined. Data scarcity is presumably the cause of literature scarcity as well. The virtually only relevant academic paper finds that investors use

different management assessment approaches and to a varying degree (Smart, 1999). Further, related literature suggests that the buyout firms may value the operating business per se over the management team (Kaplan et al., 2009) or even expect to replace the CEO already ex-ante acquisition (Rogers et al., 2002). In sum, management quality may not be paramount to entering into an investment, a vital consideration for the interpretation of the following analysis.

Another dimension to consider is the effect that the type of seller to the PE buyer may have on CEO turnover. Descriptive analysis of this characteristic suggests notable differences across the three main types of sellers. Specifically, companies acquired from founders or founding families see 74% CEO turnover per exit observation, closely followed by financial sponsors (67%) and corporate sellers (60%). Examining CEO turnover frequency only for those firms that exhibit turnover ex-post entry evidences similarly small differences (Appendix XII). Other seller types are observed infrequently in the sample at hand, underlining the prevalence of the three types of sellers in Swedish PCBOs. The noteworthy differences are in line with intuition. For example, different types of sellers may imply divertingly adequate incumbent management. In addition, the aforementioned prevalence of PE investors as buyers in succession situations is congruent with the high turnover in firms sold by founders or founding families. On another dimension, differences in entrepreneurial opportunities that could not be pursued under the previous owners are conceivable (Wright, Hoskisson, Busenitz, & Dial, 2001). The international PE control group examined exhibits a strong concentration on financial sponsors as sellers (80%) and otherwise acquires from corporate sellers (20%). Seller type delimited CEO turnover is uniformly in line with the overall control group rate (67%).

Directly related to seller type, the potential influence of a founder (-family) CEO ex-ante the entry of the PE firm on CEO turnover warrants investigation. Such CEO types are identified to be ubiquitous, evident in 27% of all PE observations (Appendix XIII). While 35% of the identified founder (family) CEOs depart within one year of entry, an equal share leaves over the remainder of the holding period (35%) and a similar portion stays with the company throughout the holding period (29%). It is conceivable that the departure of founder (-family) CEOs over the holding period is largely associated with a previously agreed transition period, foreseeable already at entry. The CEO turnover rate among founder (-family) CEOs (70%) is notably higher than the remainder of observations in the PE sample (64%). This finding is in line with expectation, given that Private Equity buyers are commonly regarded as an important group of buyers in succession

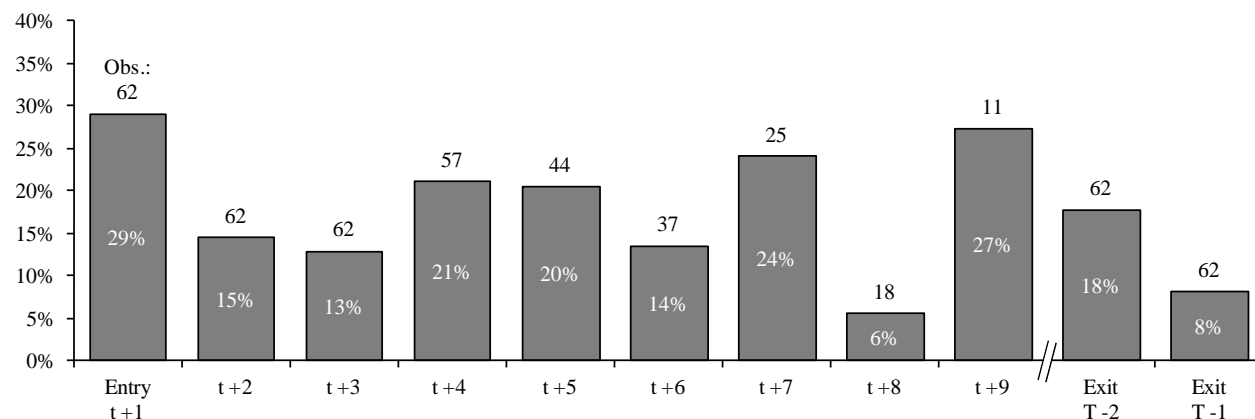
situations (Granata, 2010). Moreover, there is evidence of a weakened performance turnover relationship if the CEO in reference has ties to the owner family (Lausten, 2002). However, the observations with founder (family) CEOs are too few to allow for statistically reliable inferences beyond mere observed turnover.

On a related dimension, the buy-in type denoting whether the company is acquired together with management or without management, may influence management turnover. It should once more be emphasized that such a granular nomenclature to distinguish LBOs is applied inconsistently in both practice and academia (section 2.1) and considered inherently imprecise by this study. Nonetheless, the analysis of buy-in type according to the MergerMarket classification is included for the sake of completeness (Appendix XIV), but not deemed to allow for well-grounded inferences.

The most curious and intuitive inquiry relating to the entry phase may well be whether CEO turnover differs from the remainder of the holding period. In brief, it does in the sample examined in this study. As Figure IV illustrates, the first year after entry marks the highest turnover rate (29%) among all one year delimited periods across the holding period.

Figure IV
CEO turnover rates across holding period

This figure illustrates CEO turnover rates across different one-year holding period intervals. Entry (t) and exit (T) denote the beginning of the respective year, hence t +1 denotes the first year of the holding period. Notably, the x-axis is broken and thus not continuous, to accommodate timeframes preceding the exit. Columns denote turnover rates, figures on top indicate the number of relevant firm observations.

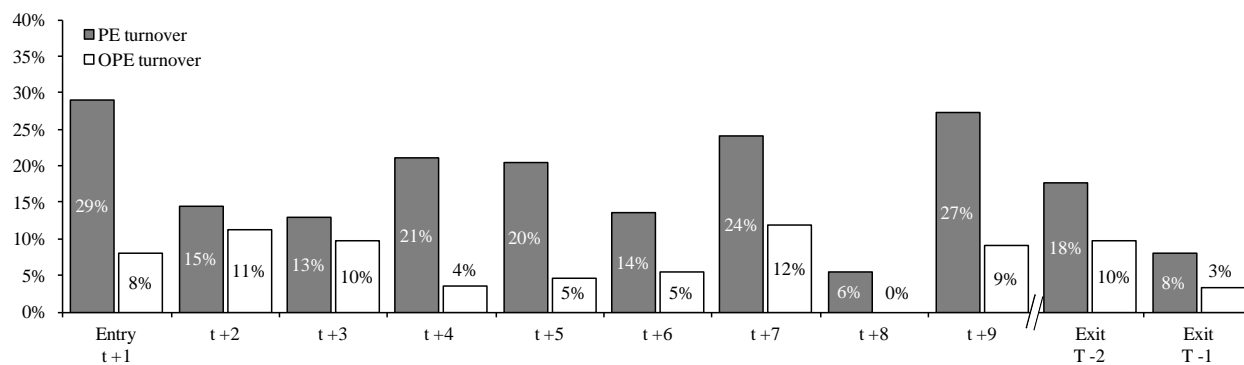


The rate is markedly close to that observed by Räisänen (2017) over the first year (32%) using a fairly comparable set of Finnish PCBOs. Guo et al. (2011) find a distinctly higher rate (37%) in their sample of P2Ps over the same period. This difference in turnover rates to P2Ps is not

necessarily surprising, as P2Ps, more so than PCBOs, arguably connote management issues. Examining relative CEO turnover frequency conditional on turnover across the holding period reveals a similar picture. The largest share (25%) of total CEO turnover instances (72) occur within one year of entry. Different factors contributing to these findings are conceivable. Early turnover in PCBOs may for example be considerably affected by the prevalence of succession situations in PE-backed buyouts (Granata, 2010). Moreover, buyout firms may simply not deem the CEO suitable ex-ante the investment decision, but acquire the company for its underlying operating business (Rogers et al., 2002). Alternatively, limited access to management and thus limited depth of possible management assessment in the due diligence phase, especially prevalent in sophisticated sales process (Räisänen (2017)), may impede the acquirers ability to evaluate management quality ex-ante. To control for unobservable effects such as potentially biasing exogenous effects, e.g. macroeconomic or industry-specific developments, the OPE sample is used as reference. The OPE sample is naturally not subject to entry-exit dynamics inherent to closed-end funds. Figure V distinctly illustrates that the notable variation in CEO turnover in the PE sample over the holding period does not appear to be attributable to trivial exogenous effects.

Figure V
CEO turnover rates across holding period (PE versus OPE)

This figure illustrates CEO turnover rates across different one-year holding period intervals, comparing the PE and the OPE sample. Entry (t) and exit (T) denote the beginning of the respective year, hence t +1 denotes the first year of the holding period. Notably, the x-axis is broken and thus not continuous, to accommodate timeframes preceding the exit. The number of relevant firm observations in the respective sub-samples is analogous to Figure IV.



Turnover in the OPE sample is generally lower, but also fluctuates in a narrower bandwidth and does not diverge upwards during the period that is analogous to the first year of investment (t+1) for the PE sample. In line with the investment process chronology, turnover around exit is discussed in section 5.3.

5.2. Holding period

The ensuing examination of CEO turnover with respect to the holding period first distinguishes aspects attributable to the engineering of value creation over the holding period. Subsequently, an examination of patterns in CEO turnover across the holding period more broadly is performed.

5.2.1. *Value creation engineering*

The three active value creation levers financial-, governance- and operational engineering proposed by Kaplan and Strömberg (2009) find application across all phases of the investment process. However, only a limited selection from the broad spectrum of conceivable engineering changes is considered relevant in light of CEO turnover. For example, financial engineering by means of acquisition financing or operational engineering via improvement programs are crucial areas of value creation but largely irrelevant for this study. The following discussion of engineering levers is therefore limited to those that are presumed to be potentially related to CEO turnover and most relevant over the holding or value creation period.

The design of management incentives is a key means of governance engineering that may impact CEO turnover. While the equity incentive structuring in particular can also be means of financial engineering, e.g. in the context of tax or capital structuring (Levin, Perl, & Hirschtritt, 2004), this dimension is not deemed to have a direct bearing on CEO turnover. The literature rather univocally finds equity participation to be a common form of incentive scheme in buyouts. This would intuitively suggest a negative association to voluntary CEO turnover. In addition, there is ample evidence that equity incentives for management are positively associated with operating performance (Kaplan, 1989; Phan & Hill, 1995; Thompson, Wright, & Robbie, 1992). Conversely, there is also evidence of management ownership in PE-backed companies insinuating increase risk aversion (Holthausen & Larcker, 1996) and of no association with gains in operating performance of any kind (Bergström, Grubb, & Jonsson, 2007). The PE sample in this study exhibits an average residual ownership share of 21.1% not owned by the buyout fund at entry. Under the arguably strong assumption, that residual equity ownership interest is in fact solely owned by management, this study does not find any significant relation between management ownership and CEO turnover over the holding period (Table III). It is conceivable that management ownership per se, rather than the relative share is decisive. Under this presumption, the finding is not surprising, given that

equity participation of management is commonplace in PE-backed companies (Kaplan & Strömberg, 2009).

Table III

Management ownership - CEO turnover two-sample t-test

This table summarizes the output of a two-sample t-test analyzing differences in residual equity stake between two sub-samples of our PE sample, delimited by whether there was CEO turnover or not. Residual equity stake is defined as the portion of equity not acquired by the PE investor and is used as a proxy for management ownership. Asterisks denote significance level: 10%-level (*), 5%-level (**), 1%-level (***).

Condition	Mean	Variance	Observations	df	t-stat	p > t
Turnover	0.20	0.02	41	36	2.03	0.30
No turnover	0.24	0.03	21			

There are various reasons why the residual ownership may not be entirely attributable to management. For example, the previous owner may retain minority interest or other types of co-investors may underwrite the buyout. On the other hand, Kaplan and Strömberg (2009) find only marginally smaller ownership (16% median) attributable to management in US P2Ps than the residual ownership observed in this sample. Similarly, Acharya, Kehoe, and Reyner (2008) find a median of 15% in large UK LBOs. Another critical aspects to consider in this context is the difference between management and CEO equity ownership. Kaplan and Strömberg (2009) find that median CEO ownership (5.4%) measures up to circa one-third of management ownership. However, a broadly proportional relationship between CEO and management ownership is conceivable. None withstanding, any findings based on simple management share capital ownership would be impacted by the fact that management incentive structures cannot be captured using mere ownership share. Reasons for this involve inter alia the common use of different capital structure instruments beyond common equity, or even synthetic structures, and contract features more broadly (Cronqvist & Fahlenbrach, 2013; Levin et al., 2004). Common management contract features in PE-backed companies, further elucidate why mere management ownership may not be decisive for CEO turnover. One example are good/bad leaver provisions that stipulate the governance of CEO departure. A bad leaver definition typically includes replacement due to dishonesty or lack of competence (Gilligan & Wright, 2014). In a bad leaver scenario, the equity participation is usually bought back at the lower of cost or market value. Good leaver scenarios do not necessarily include voluntary CEO departure, but usually death or disability. This dimension

of the PE governance model and its implications have thus far received little attention in academic research.

A popular means of operational value creation is using the acquired firm as a platform to make add-on acquisition, often as part of a distinct strategic avenue referred to as buy-&-build (B&B) strategy. Part of the rationale of B&B strategies is realizing economies of scale when grouping add-on acquisitions under superior management capacity (Borell & Heger, 2013). Different implications for CEO turnover are conceivable. On the one hand, the required quality of management may not be available within the platform investment ex-ante the holding period, fostering turnover. On the other hand, management capable of executing such strategies may be too scarce to cope with turnover. As illustrated in Table IV, the B&B categories of substance with respect to number of observations are those with no or one add-on acquisition over the holding period. These two categories exhibit turnover rates broadly in line with the overall PE sample (66%), namely 67% and 61%, respectively.

Table IV
CEO turnover by B&B intensity

This table summarizes the B&B intensity and related CEO turnover (frequency) observed in the sample. Categories are delimited by number of add-on acquisitions and ranked by number of exits with CEO turnover.

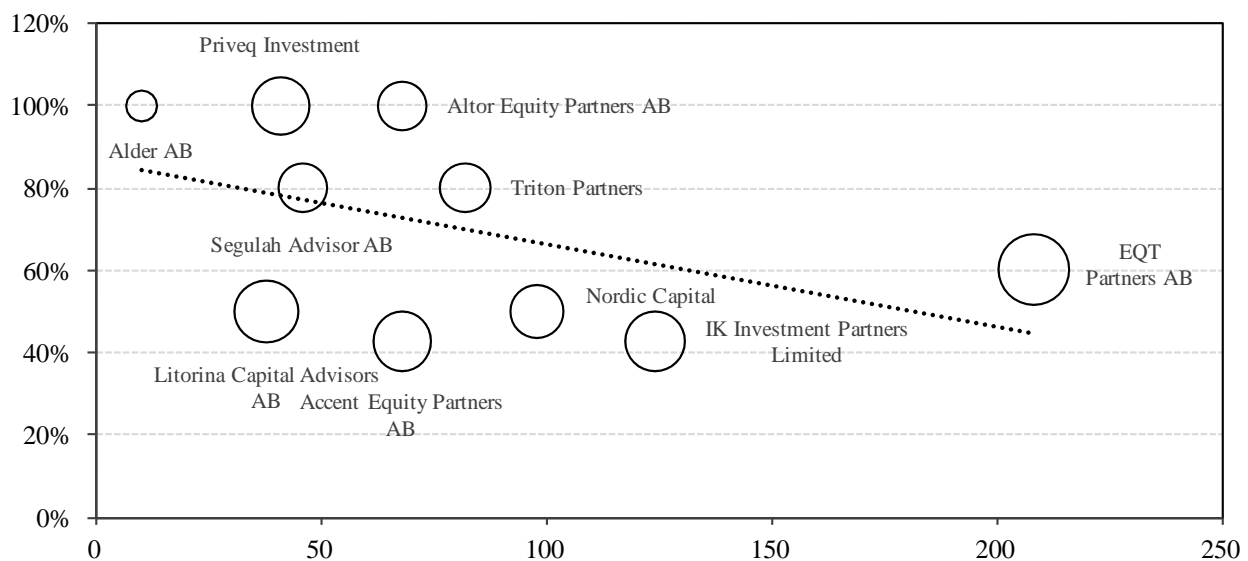
Number add-ons	Rank	Exits	Turnover events	per exit	Turnover frequency	per exit	per turn. exit
No add-ons	1	27	18	67%	30	1.1	1.7
1 add-ons	2	18	11	61%	14	0.8	1.3
2 add-ons	3	8	7	88%	12	1.5	1.7
3 add-ons	4	4	3	75%	9	2.3	3.0
5 add-ons	5	1	1	100%	4	4.0	4.0
4 add-ons	5	2	1	50%	1	0.5	1.0
8 add-ons	7	1	-	-	-	-	-
9 add-ons	7	1	-	-	-	-	-
Total		62	41	66%	70	1.1	1.7

Evidence from B&B intensive observations is merely indicative as corresponding differences in turnover were found to be statistically insignificant, presumably due to sub-sample size. Nonetheless, the few relevant observations in the sample with an elevated number of add-on acquisitions exhibit curiously high turnover (except for the one observation with 4 add-ons).

Illuminating another engineering dimension, the hiring and firing of management directed by the buyout firm is a means of governance engineering (Gompers et al., 2016). Siegel et al. (2010) suggest that PE firms value the management team to a differing extent vis-à-vis their investment case. This motivates firmer investigation of whether there are differences in CEO turnover across acquiring funds. The sample constructed for this study is desirably designed to examine such potential differences. Firstly, it is composed top-down based on a choice of buyout firms, rather than bottom-up based on transactions. Secondly, it exclusively contains majority investments, rendering personnel decisions entirely at the discretion of the PE firm. Interestingly, the analysis of the sample reveals some support for a difference across funds. Specifically, there are apparent indications that CEO turnover may be negatively related to buyout firm experience supported by binary- and CEO turnover frequency (Figure VI).

Figure VI
CEO turnover by fund experience

This figure illustrates CEO turnover (y-axis) by fund experience (x-axis) and number of exit observations (bubble size).



The three most experienced funds in the sample (EQT Partners AB, IK Investment Partners Limited and Nordic Capital) all exhibit lower CEO turnover rates than the PE sample as a whole (60%, 43% and 50%; Appendix XV). While the data examined in this study does not allow for conceivable inferential inferences, an experience time-series analysis of CEO turnover could further elucidate this indicative relationship. Notably, this finding is inconsistent with Räsänen (2017), who finds some empirical support for a positive association between CEO turnover and

buyout fund experience, however based on CEO turnover within one year of entry only. The buyout funds in the international PE control group exhibit greater deal experience (218 deals per firm) than their Swedish counterparts (73). Curiously, the average turnover rate (67% international PE sample) is even marginally higher (66% Swedish PE).

5.2.2. CEO turnover across the holding period

This sub-section discusses patterns in CEO turnover, initially in the PE sample alone, with reference to the comparable OPE sample and international control group, and concludes with an extensive examination of the relative CEO turnover patterns in the matched overall PE-OPE sample. Notably, the financial development will be analyzed in the subsequent exit phase section, as it is deemed to have a distinct link to the exit decision as well as the economic value creation from the exit event.

Examining retirement adjusted CEO turnover delimited by frequency reveals not only how common the replacement of the CEO in the sample at hand is. It also illustrates the prevalence of multiple replacements over the holding period. The vast majority of exit observations (69%) exhibits either no turnover at all (34%) or only one turnover event (35%) over the entire holding period (Table V). Conversely, this also shows that a substantial 31% of investments sees more than one CEO turnover. Causation of these turnovers cannot be readily inferred, thus this does not imply that the buyout funds examined replace 31% of CEOs after actively installing them. In addition, as will be illustrated in the following, holding period length is crucial when interpreting CEO turnover frequency. Comparing the turnover frequency to the OPE sample highlights a substantial difference in distribution. Specifically, the clear majority of observations in the OPE sample (61%, 68% retirement adjusted) does not experience any turnover over the period examined, exceeding the corresponding PE sample figure by 34 ppts. Moreover, only a small portion of observations exhibits turnover more than once (5%). Even when excluding entry year turnover observations in the PE sample, the difference in distribution still differs widely. The observed turnover rate in the OPE sample (39%) is similar to that observed by Lausten (2002) for Danish firms (32%) but exceeds those in studies on large private firms (Coles et al., 2003; Gao & Li, 2015). Notably, adjusting for retirement does not alter the distribution across frequency categories substantially in either of the sub-samples. Finally, the international PE control group lends support to the preceding findings, exhibiting a comparable distribution across the turnover frequency categories. Presumed comparability is further supported by akin overall turnover rates (66% Swedish PE, 67%

international PE). Interestingly, though potentially attributable to the size of the control group, the same does not encompass any exit observations with more than two turnovers, as opposed to the PE sample (13%).

Table V

CEO turnover frequency (retirement adj.) by sub-sample

This table summarizes the amount of observations featuring a certain number of turnover events across both the PE and OPE sample as well as the percentage share of the respective total sample that features that given number of turnover events. Note that count refers to the amount of exited investments that feature the number of turnover events given in the leftmost column, not instances of CEO turnover. The excl. entry column denotes turnover events excluding the first year of PE ownership to elucidate differences in turnover without effects potentially attributable to the entry year, which naturally does not exist in the OPE sample.

# Turnover events	PE				OPE	
	Count	Share	Excl. entry	Share	Count	Share
No turnover	21	34%	28	45%	42	68%
1# turnover	22	35%	21	34%	17	27%
2# turnover	11	18%	9	15%	3	5%
3# turnover	6	10%	3	5%	-	-
4# turnover	2	3%	1	2%	-	-
>4# turnover	-	-	-	-	-	-
>1# turnover	19	31%	13	21%	3	15%
Total	62	100%	62	100%	20	32%

The analysis of relative CEO turnover in PE- and OPE-backed firms constitutes one of the main contributions of this study. The ensuing analysis of the same therefore deserves particular attention. First and foremost, PE-backed companies are found to experience considerably higher CEO turnover than their OPE-peers over the same observation period. This finding is consistent and of high statistical significance (1% level) across measurements of CEO turnover, i.e. binary and frequency, and irrespective of whether retirement age is adjusted for or not. This finding is arguably in line with informed intuition, recalling the notions of succession situations or limited evidence of effective management due diligence. On the other hand, previous literature may foster a different ex-ante expectation. Cornelli and Karakaş (2015) find that CEO turnover decreases after an initial transition phase, and is subsequently less contingent on performance, relative to the peers that remain public. In sum, while high turnover at entry is in line with expectations based on the literature and intuition, the consistently higher and more frequent turnover in the PE sample

(Figure V) is not. These findings warrant closer examination both in the following and future research.

The t-statistics (Table VI) summarize the significant differences across the two sub-samples, considering different analysis parameters. The retirement adjusted CEO turnover frequency, deemed the most meaningful comparison dimension for this type of analysis, indicates a mean of 1.13 CEO turnovers in the PE- and 0.37 in the OPE sample. While expressed differently, this is mathematically consistent with the turnover rates discussed beforehand (66% turnover in the PE sample and 31% of observations exhibiting more than one turnover). The difference in means between the two sub-samples is highly significant (1%-level). Notably, the variance in binary turnover is more akin between PE and OPE than for turnover frequency simply due to transformation into binary form.

Table VI
CEO turnover: Two-sample t-tests

This table summarizes the output of several two-sample t-tests analyzing differences in CEO turnover (both measured as binary CEO turnover and turnover frequency; retirement adjusted and not) between the PE and OPE samples. The first column gives the turnover metric analyzed for each test (in bold) as well as defines which sample each row relates to (PE/OPE). The remaining columns denote t-tests outputs. Asterisks denote significance level: 10%-level (*), 5%-level (**), 1%-level (***). Difference and t-statistics are noted as absolute values.

CEO turnover	Mean	Variance	Obs.	df	Difference (t-stat)	P> t
Frequency (retirement adj.)						
PE	1.13	1.20	62	95	0.76	0.00
OPE	0.37	0.34	62		(1.99***)	
Frequency (not retirement adj.)						
PE	1.15	1.27	62	95	0.69	0.00
OPE	0.45	0.38	62		(1.99***)	
Binary (retirement adj.)						
PE	0.66	0.23	62	122	0.34	0.00
OPE	0.32	0.22	62		(1.98***)	
Binary (not retirement adj.)						
PE	0.66	0.23	62	122	0.27	0.00
OPE	0.39	0.24	62		(1.98***)	

To further explore the markedly significant difference between CEO turnover in PE- and OPE-backed firms, regression analysis is employed.

Performing a multivariate regression on CEO turnover frequency, renders ownership type, i.e. whether the company is PE- or OPE-backed, the most significant coefficient in the underlying set of variables (Appendix X). Specifically, the binary ownership variable with a coefficient of -0.672 is highly significant (1%-level). CEO turnover frequency in the regression model decreases by 0.672 instances when the company is OPE-backed. This finding is in line with the preceding analysis and especially expected given the fundamental inferential analysis. In addition, the binary retirement variable is found to have a positive coefficient of +0.666 but of marginally lower significance (5%-level). In the regression model, CEO turnover frequency increases by 0.666 when the CEO is in retirement age. Notably, there is only low number of observations with CEOs in retirement age (section 3.2). This finding is in line with intuition, as well as Gong and Wu (2011), who find some statistical evidence of CEO age predicting turnover frequency. Since this regression model tests retirement age in conjunction with CEO age, the fact that the latter is not statistically significant is in line with expectation. Moreover, the investment- or observation period horizon has a significant (1%-level) positive effect (+0.013 regression coefficient). The horizon variable is measured in months, i.e. every additional month of holding or observation period increases turnover frequency by 0.013 instances. Notably, the holding period is always greater than 24 months due to sample selection criteria. A transformation to years is refrained from to maintain the granularity of the analysis, despite natural repercussions for interpretation. This positive association between holding period length and CEO turnover is in line with intuition, especially when considering voluntary CEO departures. On the other hand, the management incentives commonly deployed by buyout funds dis-incentivize premature voluntary departure. Other speculative explanations for this finding in practice are manifold. If buyout funds were to replace CEOs after poor performance, additional time for the new CEO to potentially rectify the same may be required. Moreover, a new CEO may be installed for a new company lifecycle stage that the incumbent investor still wants to capitalize on. The remainder of the independent variables are not found to be statistically significant in the context of this regression model. This is in accord with Gong and Wu (2011), who examine many of the same variables and do not find statistically significant evidence of their meaningfulness either. Financial performance measures were not examined in the regression analysis, as the number of matched PE-OPE firm pairs with available data would have reduced eligible observations substantially. In sum, the aforementioned variables of this regression model explain 31.9% (R-squared) of variation in CEO turnover frequency in the

sample analyzed in this study (Table VII). It should be noted that the adjusted R-squared is not relevant in this model due to the deployment of robust standard errors (section 4.2).

Table VII
CEO turnover frequency regression model

This table summarizes the output of a multivariate regression model for CEO turnover frequency. Coefficient values and their related statistical attributes are given in the four middle rows for the included independent variables as well as the constant while the bottom rows gives the R² value for the model. Asterisks denote significance level: 10%-level (*), 5%-level (**), 1%-level (***). Values in the t-stat column are given as absolute values. All coefficients listed are unequal to zero, but are rounded to three decimals.

CEO turnover frequency	Coefficient	Std. Err.	t-stat	P> t
OPE	(0.672)	0.154	4.370***	0.000
Retirement	0.666	0.332	2.010**	0.047
Horizon	0.013	0.004	3.670***	0.000
Firm size (sales)	0.000	0.000	0.630	0.532
Firm size (EBIT)	(0.001)	0.001	0.550	0.583
Firm age	0.003	0.003	0.860	0.391
OMX (total) return	0.118	0.266	0.440	0.659
CEO age	(0.006)	0.006	0.920	0.358
Investment vintage	0.025	0.022	1.160	0.248
Constant	(50.147)	43.559	1.150	0.252
R2	0.319			

The regression model for binary CEO turnover principally underlines the findings of the preceding turnover frequency model. The independent variables that are statistically significant in the binary turnover model are identical to those in the turnover frequency model, yet naturally with divergent coefficients (Table IX). The latter is first and foremost attributable to the binary properties of the dependent CEO turnover variable in this model. Binary CEO turnover decreases by 0.318 (-0.318 regression coefficient) when the company is OPE-backed. The underlying ownership variable is still significant at the 1%-level. Similarly, the binary retirement variable remains significant (5%-level). Binary CEO turnover increases by 0.398 (+0.398 coefficient) when the CEO is in retirement age. Interestingly, Räisänen (2017) in a study examining binary CEO turnover, while not controlling for retirement age per se but CEO age, finds the same to be highly significant. The horizon variable is found to be less but still notably significant in this model (5%-level). One additional month of holding- or observation period adds 0.005 to binary turnover. To reiterate, the coefficients cannot be readily compared across the regression models. Finally, the binary regression explains 12.8% (R-squared) of variation in binary CEO turnover. The lower explanatory power could arguably be expected, given the similar set of independent variables, but

binary-form dependent variable, diminishing nuances in the relationships underpinning the regression.

Table VIII

Binary CEO turnover regression model

This table summarizes the output of a multivariate regression model for binary CEO turnover. Coefficient values and their related statistical attributes are given in the four middle rows for the included independent variables as well as the constant while the bottom rows gives the R^2 value for the model. Asterisks denote significance level: 10%-level (*), 5%-level (**), 1%-level (***). Values in the t-stat column are given as absolute values. All coefficients listed are unequal to zero, but are rounded to three decimals.

Binary CEO turnover	Coefficient	Std. Err.	t-stat	P> t
OPE	(0.318)	0.092	3.450***	0.001
Retirement	0.398	0.185	2.140**	0.034
Horizon	0.005	0.002	2.340**	0.021
Firm size (sales)	(0.000)	0.000	0.140	0.891
Firm size (EBIT)	(0.001)	0.000	0.290	0.769
Firm age	0.001	0.002	0.310	0.755
OMX (total) return	0.524	0.148	0.350	0.725
CEO age	0.002	0.005	0.350	0.726
Investment vintage	0.014	0.013	1.090	0.277
Constant	(28.874)	26.691	1.080	0.282
R2	0.128			

5.3. Exit phase

Structurally to a large extent analogous to the entry of the investment, the exit does not merely demarcate a point in time when the divestment of a company occurs. More accurately, it is a phase encompassing the preparation of a usually structured sales process, as well as a singing and closing period akin to the entry phase. In general, and in the particular context of CEO turnover, several dimensions suggest themselves for analysis. As the exit of the investment denotes the conclusion of the holding period, inferences between CEO turnover and holding period are warranted. Moreover, the exit type and implicitly the type of buyer in an exit event could be of interest. Lastly, as outlined beforehand, the exit also marks the realization of value created over the holding period. Whereas actual investment returns on deal level are in the vast majority of cases not disclosed for closed-end buyout funds, financial development over the investment period may lend itself as a crude proxy and should be examined with respect to CEO turnover. This sub-section illustrates and discusses the analysis of the aforementioned aspects in order, but emphasizes the financial development dimension in particular.

5.3.1. Exit characteristics and CEO turnover

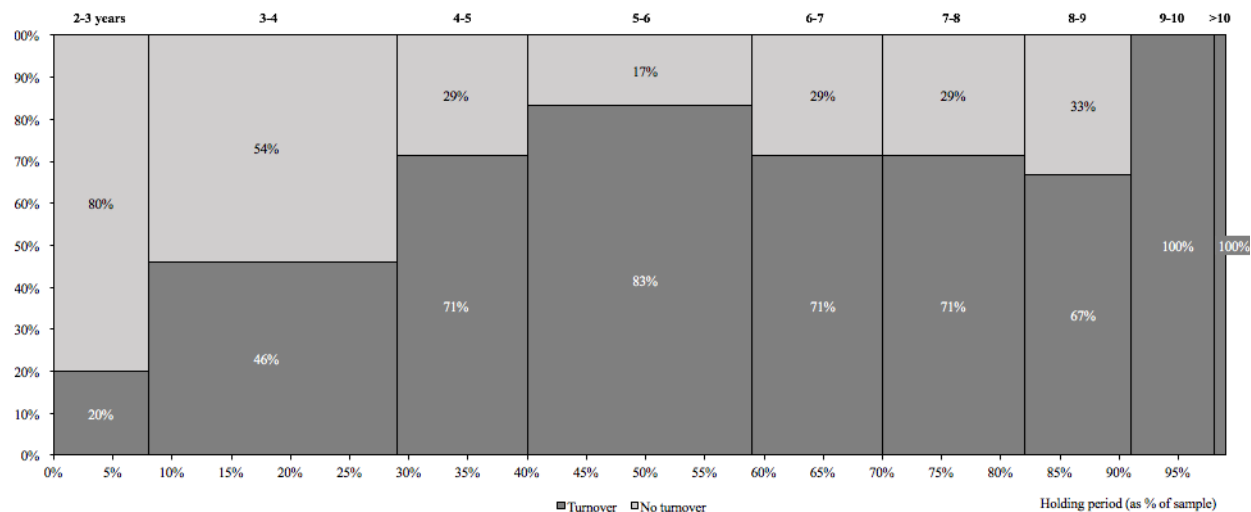
The Swedish PE sample exhibits a median holding period of 5.4 years (average 5.7 years), which can be considered within the ordinary bandwidth of four to six years (section 2.2). For comparison, the equal-weighted average of median global holding periods between 2004 and 2018 is 4.5 years (Bain & Company, 2018). The global benchmark is similarly exceeded when examining the holding periods in this sample across exit years (Appendix XVI). Despite the apparent differences, both the holding periods in the sample and the benchmark follow a pattern broadly tied to the global economy. In particular, the holding periods tend to decrease in economically prosperous times and vice versa in times of economic contraction. The pattern can be readily observed in the decline of holding periods towards the global financial crisis and recent years, as well as contrarily in the aftermath of the crisis. Notably, the holding periods observed in this study are biased upwards and thus convey a notion of survivorship bias towards investments of moderate performance. Specifically, quick flips, defined as investments held for less than 24 months (Kaplan & Strömberg, 2009) were precluded from the data collection for the purposes of this study. As Acharya et al. (2012) note, buyout funds tend to hold on to modest investments longer. To alleviate concerns of survivorship bias, the sample of buyout funds examined is investigated with regard to bankruptcy incidents. No bankruptcy cases potentially precluded from data underlying the sample were identified. Notably, one investment in the PE sample was in fact "exited" into bankruptcy.

When examining CEO turnover across the different holding periods, a trend of CEO turnover increasing with holding period length becomes apparent (Figure VII). Specifically, the holding periods below four years exhibit below sample average turnover rates (66%), those between five and nine years lie above the average and lastly, those that are even longer display 100% turnover, but among few observations.

Figure VII

CEO turnover by holding period length

This figure illustrates the CEO turnover (x-axis) delimited by holding periods in percentage of the overall sample (y-axis).



This finding is consistent with the significant effect of investment horizon in the regression analysis. The international control group exhibits markedly similar holding period patterns. Particularly, the control group displays a median holding period of 5.6 years (average 5.4 years). However, the holding periods are less spread out (100% observations within 3-8 years holding period). The indicative holding period to CEO turnover relationship observed in the Swedish PE sample is also, but less distinctly, evident in the international control group. This trend may be more distinct when deploying a larger control group.

As established in section 5.1, the highest CEO turnover rate (29%) in the PE sample over the holding period falls within the first year. Conversely, it is of interest to what degree CEO turnover occurs around the exit phase. Figure IV, discussed with respect to the entry phase, illustrates that CEO turnover is extraordinarily low in the year leading up to the exit (T-1) of the investment (8%) and fairly low in the penultimate year (T-2) of the holding period (18%). This finding is arguably in line with intuition. The CEO as central figure of every company is key in a sales process. On another dimension, if the buyer is not a strategic one, e.g. another financial investor, companies with an established management teams are naturally preferred targets. The literature underlines these intuitive notions. In an analysis of PE-backed exits, Povaly (2006) attests that management commitment and involvement is indispensable for a successful exit. Similarly, a stable development of the company is essential in exits to the public capital markets

(Ross & Hopkins, 2011). On the contrary, it is conceivable that the absence of an "exit-ready" management team, e.g. due to the voluntary departure of a CEO before or even in the course of the exit, may lead to a valuation and thus investment return discount. The OPE sample turnover rates over the analogous time periods (Figure V) allow to control for unobservable exogenous factors. Notably, the OPE sample does not contain any changes in control alike exits in the PE sample. The observation period corresponding to the penultimate pre-exit year exhibits only slightly elevated turnover. The final year turnover is lowest across periods. Therefore, the OPE sample lends some further support to the notion of exit readiness in the PE sample.

In the context of CEO turnover around the exit phase, the question of potential implications of the type of eventual exit for or even due to CEO turnover patterns suggests itself. With respect to relative frequency of exit routes, the PE sample is clearly dominated by the common exit channels trade sale (48%), i.e. the sale to a strategic investor, and SBOs by other financial investors (29%). Substantially less frequently, the buyout funds in the sample exit their investments via an initial public offering (IPO) in the public equity markets (15%). Interestingly, the findings of Kaplan and Strömberg (2009) suggest that the public market as exit channel for PE lost traction since the earlier years of the asset class (-15 pts. equal-weighted average from 22% 1980-99 to 7% 2000-07 globally). This attests a well-function IPO market in Sweden (Næss-Schmidt et al., 2017). Finally, other exits only make up 8%, comprising e.g. exits to private investors and one bankruptcy case. This pattern is broadly in line with the Swedish PE market in general, even though the relative shares across exit routes vary widely over time (cf. Næss-Schmidt et al., 2017). Usually, buyout funds prefer IPOs and trade sales as exit routes (Chapman & Klein, 2010). Key motives are inter alia the implicit success of the investment qualifying it for a public markets exit and the ability of strategic buyers to reap synergies, respectively. Curiously, these two exit routes exhibit higher than sample average CEO turnover (Table IX), indicating that CEO turnover is not a sign of poorly performing investments but potentially even the opposite.

Table IX**CEO turnover by exit type**

This table summarizes the number of exited investments and measures of CEO turnover based on the seller type from which the company was acquired. Exit types are ranked by CEO turnover. The analysis is categorized by the MergerMarket exit type classification: OE (Other Exit), not clearly specified exit route. TS (Trade Sales), exit to strategic investor. SBO (Secondary Buyout), defined as exit to financial investor, including Tertiary Buyouts (TBO), etc. IPO (Initial Public Offering), exit to public (equity) market investors.

Exit type	Rank	Exits	Turnover events	per exit	Turnover freq.	per exit	per turn. exit
IPO	1	9	7	78%	15	1.7	2.1
TS	2	30	21	70%	38	1.3	1.8
OE	3	5	3	60%	6	1.2	2.0
SBO	4	18	10	56%	11	0.6	1.1
Total		62	41	66%	70	1.1	1.7

The observed high turnover in investments exited via IPO is in agreement with the notion of exit-readiness, considering the extraordinary demands of leading a public company. The elevated turnover rate in trade sales is fairly unexpected, considering that strategic buyers in trade sales by nature do not rely strongly on incumbent senior management. SBOs, the exits with the lowest observed CEO turnover (56%), arguably depend stringently on stability of top management from an exit perspective. Speculatively, this relation may merely be spurious and actually attributable to the underlying investment performance. The international PE control group, once more exhibits similar patterns. Specifically, SBOs and trade sales represent the largest share of exits, 47% and 33%, respectively. IPOs account for the remaining 20%. SBOs, akin the findings for the Swedish PE sample, exhibit the lowest turnover rate (57%). Trade sales and IPOs are found to be associated with higher turnover rates (60% and 100%, respectively).

5.3.2. *Financial performance and CEO turnover*

Afore delineating the findings on financial performance from entry to exit, the presumed implications from assessing reported financial metrics in this study warrant discussion. Reported financial metrics are inherently biased by non-recurring items rendering recurring financial performance not readily observable. Conceivable examples inducing downward bias include restructuring cost, non-recurring litigation or exceptional warranty cases. Upward bias may e.g. be attributable to the divestment of business units or accounting revaluations. The assessment of recurring performance is of crucial interest for both incumbent and future investors. Larcker and Tayan (2010) for example, find that more than half of the public firms examined report financials

adjusted for non-recurring items to their investors. While publicly listed firms have a distinct incentive to engage in earnings management, a clear perspective on recurring financial performance is in the interest of the investors none withstanding this incentive. Similarly, future investors commonly base their firm valuations on adjusted, rather than reported financial performance (Pearl & Rosenbaum, 2013). However, there is compelling evidence that a non-recurring financial performance bias does not necessarily affect involuntary CEO turnover. Cornelli and Karakaş (2015) find CEO turnover is less sensitive to performance ex-post P2P, vis-à-vis public company peers. The authors attribute this to the buyout funds close monitoring and access to inside information. This finding may well be attributable to concentrated ownership more generally and thus also to OPE-backed companies. It should be borne in mind, that the interpretation of findings in relation to financial performance is less trivial when considering reported financial metrics. Nonetheless, the described caveat is arguably common place in the literature. Most previous studies relating CEO turnover in LBOs to financial performance, similarly rely on reported metrics (Gong & Wu, 2011; Räisänen, 2017). Essentially, only studies using confidential data (e.g. Acharya et al., 2012) may omit this caveat. The remainder of this subsection discusses the financial performance characteristics in the sub-samples as well as potential inferences for CEO turnover.

The financial performance, based on the variables put forth in section 4.1, differs starkly between the PE- and the OPE sub-sample (Table X). In particular, the PE sample exhibit superior financial performance across turnover conditions. Interestingly, the performance disparity is persistent when distinguishing whether CEO turnover occurs over the observations period. Markedly, this analysis in part conjoins non-matched observations, rendering inferential analysis nonsensical. Matched observations, demarcated based on CEO turnover, are discussed subsequently.

Table X**Financial performance: PE versus OPE**

This table summarizes the relative financial performance of observations in the PE and OPE sample, respectively. Observations in the no turnover and turnover sub-sample are conjoined in a non-matched manner.

Sample / variable				PE			OPE		
<i>Full sample</i>									
	Obs.	Average	Median		Obs.	Average	Median		
Sales CAGR	56	+12.0%	+10.9%		60	+6.7%	+6.1%		
Δ EBIT margin	55	+17.3%	+0.7%		60	(1.4%)	(1.0%)		
EBIT CAGR	46	+8.3%	+11.4%		56	(4.7%)	+2.7%		
<i>No turnover</i>									
	Obs.	Average	Median		Obs.	Average	Median		
Sales CAGR	21	+13.2%	+12.8%		41	+7.0%	+6.9%		
Δ EBIT margin	20	+2.9%	+2.6%		41	(2.0%)	(1.5%)		
EBIT CAGR	18	+30.1%	+22.4%		39	(9.6%)	+0.9%		
<i>Turnover</i>									
	Obs.	Average	Median		Obs.	Average	Median		
Sales CAGR	35	+11.2%	+11.4%		19	+6.0%	+3.5%		
Δ EBIT margin	35	+25.5%	(2.4%)		19	+0.1%	(0.9%)		
EBIT CAGR	28	(5.7%)	+7.2%		17	+6.5%	+2.6%		

This finding is in line with the customary claim of most buyout funds to invest in companies coined by strong growth and margin improvement potential, often substantiated in academia (e.g. Kaplan, 1989; Kaplan & Strömberg, 2009). Notably, the stark divergence between many of the average and median descriptive statistics indicates a wide spread of financial performance within the sub-samples analyzed. Financial performance in the international PE control group also exceeds that of the OPE sample but trails the Swedish PE sample, yet not considerably, especially given the relative sample size (section 3.2).

Considering the delimitation of the PE sample based on buyout funds, the relative financial performance of the attributable investments over the holding period can be assessed granularly. The financial performance of examined investments by buyout fund is markedly wide-ranging. In line with the preceding findings for the overall PE sample, the majority of Swedish PE firms exhibits high annualized sales and EBIT growth in the investments studied. However, some funds reveal ostensibly low or even negative growth rates. The later observation underlines that, given the reliance on reported performance and only selected investments studied, it should not be equated with buyout fund investment performance. This is especially apparent when considering that some of the most successful Swedish firms, approximated by cumulative capital raised, exhibit

meagre reported growth for the investments contained in this sample (Appendix XVII). The seemingly counter-intuitive relationship between cumulative capital raised and reported financial performance of the selected investments is also in part attributable to differences in investment strategy. Investors such as Triton Partners and Altor Equity Partners for example, also invest in underperforming companies and turnaround investment cases. Nonetheless, the analysis at the very least further motivates caution when making inferences based on reported metrics, even though it is commonplace in many studies.

The preceding discussion of descriptive statistics clearly motivates a closer investigation of potential relations between reported financial performance and CEO turnover frequency. In accord with the descriptive statistics (Table X), the PE sample exhibits a statistically significant (1%-level) difference in EBIT CAGR across the sub-samples with and without turnover. Specifically, mean EBIT CAGR in the PE turnover sub-sample (-5.7%) is significantly below the no turnover sub-sample (30.1%, difference -35.9 ppts.). While the descriptive statistics evidence noticeably skewed means or averages vis-à-vis the medians, the latter still exhibit stark differences. None withstanding small sub-sample sizes, this finding indicates that meagre reported financial performance in this PE sample at the very least coincides with CEO turnover. Without substantial ex-ante and ex-post financial performance data, the direction of the potentially causal relationship cannot be reliably assessed. However, Räsänen (2017), does not find a significant relationship between CEO turnover and financial performance ex-ante the PCBO. Conversely, Guo et al. (2011) find a weak but significant positive association between early CEO replacement and ex-post operating cash flow. Further financial performance variables in the PE sample do not prove to differ significantly. The OPE sample's financial performance is not found to exhibit any statistically significant differences across turnover conditions (Appendix XVIII).

Assessing the relative financial performance between PE and OPE based on inferential statistics in part supports the descriptive statistics. Notably, this analysis only considers sub-samples composed of matched observations to omit bias from broad differences in firm characteristics or timing. Across the two sub-samples, the assessment of reported financial performance reveals some statistical support for greater sales growth in the PE sub-sample. In particular, mean sales growth in the PE sample (12.0%) is significantly (10%-level) greater than in the OPE sample (7.2%, difference +4.8 ppts.). Further financial performance variables do not prove to differ significantly, which is unexpected given the stark difference in mean performance.

When examining the turnover condition, financial performance differences are not significant for any of the defined variables (Appendix XIX). In the no turnover condition on the other hand, differences in financial performance are indeed statistically significant. Particularly, both delta EBIT margin and EBIT CAGR are significantly (5%-level) higher in the PE sample. Notably, the means of both variables in the OPE sample are negative. Multiple speculative avenues of interpreting these findings are conceivable. Firstly, Private Equity is often found to have strong corporate governance (Gong & Wu, 2011; Guo et al., 2011; Holmstrom & Kaplan, 2001; Kaplan & Strömberg, 2009). OPE firms may in contrast be reluctant to dismiss CEOs for poor performance. Secondly, the findings may at least in part be attributable to an arguably inherent difference in PE and OPE populations sampled in this study. Buyout firms have a fairly persistent overall history of investing in successful businesses. This becomes especially clear when recalling the evident triumph of the asset class overall (section 1). It is therefore conceivable, that turnover characteristics may merely coincide with a selection of generally more successful firms. Based on the rigorous matching methodology, it is unlikely that this difference is attributable to sample selection bias.

In sum, while the examination of financial performance in this study is subject to aforementioned caveats, there is compelling evidence that financial performance in PE-backed companies exceeds that of its closest OPE peers. Moreover, within the Swedish PE sample firms that have CEO turnover exhibit inferior financial performance.

6. Limitations and future research

The main limitations of this study evolve around sample selection and characteristics that are unobservable when examining publically available data.

Limitations attributable to sample selection are predominantly geographic scope, exclusion criteria and consequently, sample size. Firstly, the geographic origin of both firms and buyout funds examined is confined to Sweden. Factors explicitly and implicitly relevant in this study such as labor laws or pension systems naturally differ across geographies. Similarly, nuances in corporate governance and cultural differences among the relevant PE and OPE owners may prevail. Therefore, the findings are not necessarily generalizable to other countries. The international PE control group is deployed as a mitigating factor. In addition, the data collected for this study is arguably not available in many jurisdictions (section 3.1). Secondly, in part

attributable to data collection restrictions, this study examines the investments of typical closed-end buyout funds with distinct investment horizons and return requirements. It is conceivable that investments by other financial investors, e.g. with open-end fund structures or a focus on growth capital, as well as comparable OPE-backed firms, exhibit different characteristics. Furthermore, the exclusion of quick flips with a holding period of less than 24 months, may limit generalizability to investments that are divested more swiftly. Lastly, this study is limited by a relatively small sample size (124 observations, 62 PE and 62 OPE meeting prerequisites). This is evident especially when performing sub-sample analysis. However, the sample size is broadly in line with previous studies in the field and markedly not composed from readily available data sets. The latter aspect also renders an increase of the sample size problematic. The closeness of the sample size to the population examined in this study is presumed to mitigate this limitation.

Limitations from unobservable characteristics that cannot be adequately reflected in the analysis include primarily the reason for CEO turnover, management incentive structures and recurring financial performance. Firstly, it is not possible to reliably establish whether a CEO turnover event is voluntary or involuntary. This is a common limitation in the literature (Guo et al., 2011; Kaplan, 1995). Secondly, this study could not establish a relationship between approximated management ownership and CEO turnover. This may well be attributable to the fact that definite CEO ownership and more importantly, the entirety of the incentive structure, cannot be determined. Lastly, as elaborated in detail in the preceding section, reported financial performance may be a subpar measure to draw inferences for CEO turnover from. This is arguably a common limitation in the broader literature as well, though one that is rarely addressed.

In line with the respective sample limitation outlined above, the study of CEO turnover in investments by financial investors other than typical closed-end buyout funds is a natural extension. While this study partially examines CEO turnover in companies that were previously backed by other financial investors, no studies systematically investigating CEO turnover ex-post PE ownership across exit routes exist. Further, the findings in this study motivate the investigation of the long-term relationship between CEO turnover and firm performance, including periods ex-ante and ex-post the buyout. This would allow for substantiated inferences about the casual link between the two. While the previous literature does examine this relationship (Guo et al., 2011; Räisänen, 2017), it only assesses brief periods restricting broader conclusions. Another extension

could be the substantiation of the association between PE fund experience and CEO turnover, similarly attested in previous studies (Gong & Wu, 2011; Räisänen, 2017). Lastly, the nuanced examination of management incentives in PE-backed companies beyond mere ownership stakes is another promising, complementary research domain. Studies on this topic would presumably enable a more multifaceted examination of CEO turnover as well.

7. Summary and concluding remarks

This study contributes to the existing literature on three noteworthy dimensions. Firstly, it adds an extensive examination to the very sparse body of literature on CEO turnover in PCBOs. Secondly, it examines the entire PE investment holding period with respect to CEO turnover, while previous studies have focused on selected intervals such as the entry phase. Thirdly, this study is presumed to be the first to assess differences in CEO turnover between PCBOs and comparable private companies.

The limitations imposed by the sample selection and the unobservable characteristics underlying the data outlined in the previous section naturally warrant caution when making inferences about practice. Nonetheless, the results derived from the preceding analysis allow for valuable indications about the management of CEO turnover in the investment process evolving around PCBOs. Overall, the attested prevalence of frequent, multifaceted CEO turnover underlines the importance of managing CEO turnover, voluntary or not, as means of active value creation. While many of the factors related to CEO turnover investigated could be deemed in part exogenous, they require vigorous attention by the investor ex-ante the acquisition and all the more throughout the investment process. The results of this study suggest that PCBOs merely by default entail CEO turnover management demands. This is especially apparent when contrasted with comparable OPE-backed firms. Further, characteristics such as the investment horizon, seller type at entry and exit route appear to coin the active management demand. It cannot be stressed enough, that buyout funds naturally differ in organizational capacity and experience required to meet these demands. Therefore, the question who the right person for the job is, is without a doubt not limited to the CEO after all.

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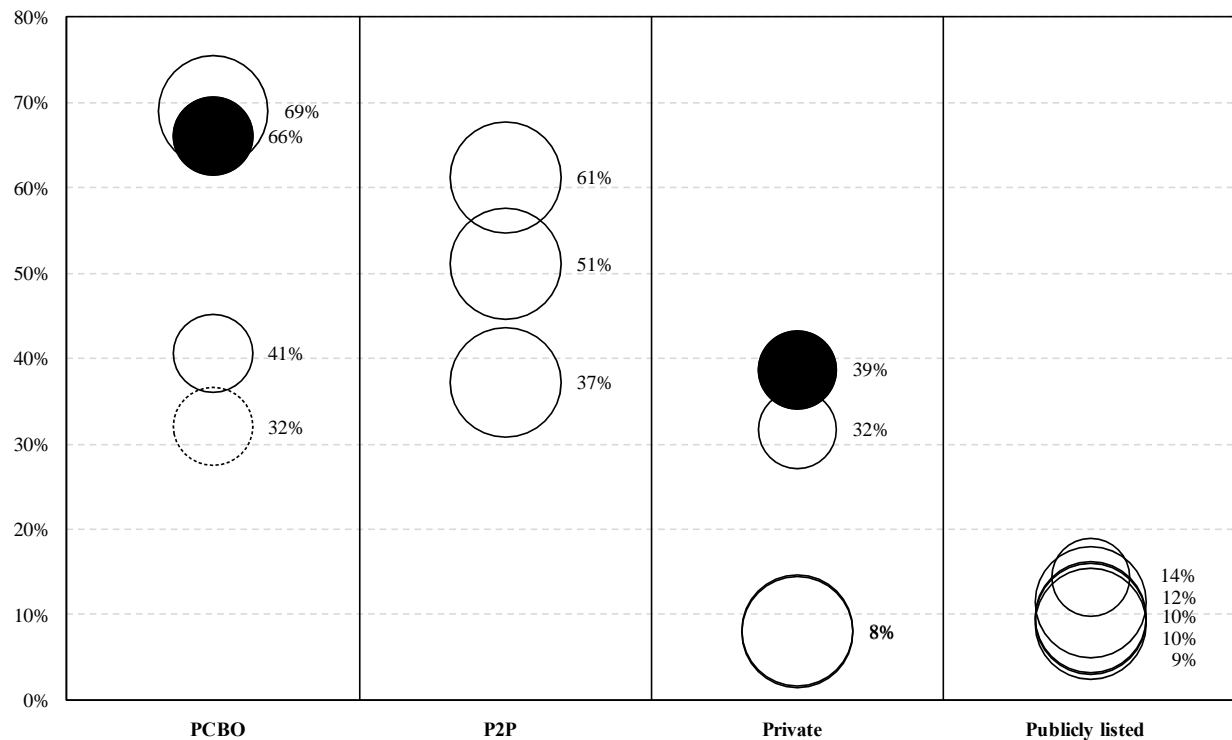
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Appendix

Appendix I

CEO turnover observations in the literature

This figure summarizes CEO turnover rates of key literature on CEO turnover in Private Equity, publically traded equities and other private ownership forms (see also Table I). The private company buyout (PCBO) sample category relates to Private Equity backed buyouts broadly, as opposed to public-to-private (P2P) transactions exclusively. Turnover rates from this study (filled bubbles) are stated as means of comparison and are not adjusted for retirement to increase comparability. The PCBO sample type category relates to Private Equity backed buyouts broadly, not public-to-private transactions exclusively. Bubble size denotes firm size (two categories). Firm size categorization performed qualitatively given multifaceted differences in study and sample designs. The dashed-line bubble refers to a published Master thesis, not an academic paper, which is deemed highly relevant given its unique study focus.



Appendix II

PE sample: Firm-level break-down

This table lists the investments included in the PE sample.

Company	Entry	Exit	PE Firm	Retirement adj. turnover events
AcadeMedia AB	2010	2017	EQT Partners AB	-
Actic Group AB	2012	2017	IK Investment Partners Limited	1
Ahlstrom-Munksjo	2004	2014	EQT Partners AB	2
Akers AB	2008	2015	Altor Equity Partners AB	2
Aleris Holding AB	2005	2010	EQT Partners AB	2
Alfa Laval AB	2000	2003	IK Investment Partners Limited	-
Alimak Group AB	2007	2015	Triton Partners	3
Apotek Hjartat AB	2009	2014	Altor Equity Partners AB	1
Atelje Margaretha AB	2005	2013	Litorina Capital Advisors AB	-
Atos Medical AB	2011	2016	EQT Partners AB	1
Atos Medical AB	2005	2011	Nordic Capital	-
Attendo AB	2007	2015	IK Investment Partners Limited	-
Autotube AB	2011	2014	Accent Equity Partners AB	1
Avaj International Holding AB	2007	2012	Accent Equity Partners AB	-
Avaj International Holding AB	2012	2018	Priveq Investment	1
Balco Group AB	2010	2017	Segulah Advisor AB	1
Bravida Holding AB	2006	2012	Triton Partners	1
Callenberg Technology Group	2001	2007	Segulah Advisor AB	-
Candyking Holding AB	2007	2016	Accent Equity Partners AB	4
CCS Healthcare AB	2010	2019	Segulah Advisor AB	2
Composite Scandinavia AB	1999	2010	Litorina Capital Advisors AB	1
Coromatic Group AB	2008	2011	Litorina Capital Advisors AB	-
Corvara Industri & Skadeservice AB	2011	2017	Accent Equity Partners AB	1
Dometic Group AB	2011	2016	EQT Partners AB	2
Dustin Group AB	2006	2015	Altor Equity Partners AB	4
El-Bjorn AB	2011	2016	Priveq Investment	1
EPiServer AB	2010	2014	IK Investment Partners Limited	-
Eton Fashion AB	2012	2015	Litorina Capital Advisors AB	-
Euroflorist Sverige AB	2002	2007	Accent Equity Partners AB	-
Exotic Snacks AB	2007	2011	Segulah Advisor AB	1
Five Seasons AB	2006	2009	EQT Partners AB	1
Fristads Kansas	2005	2015	IK Investment Partners Limited	3
Handicare Group AB	2010	2016	Nordic Capital	3
Internatural AB	2013	2016	Priveq Investment	1
JD Stenqvist AB	2003	2007	Triton Partners	2
Jernforsen Energi System AB	2011	2018	Alder AB	3
Menigo Foodservice AB	2006	2010	Nordic Capital	-
Myresjöhus AB (Prevesta)	2005	2007	IK Investment Partners Limited	-
NEA Gruppen AB	2006	2010	Segulah Advisor AB	1
Nimbus Boats Sweden AB	2006	2012	Altor Equity Partners AB	3
Office Management AB	2012	2016	Priveq Investment	1
Ovako Group AB	2010	2018	Triton Partners	2
Pelly Components AB	2006	2014	Litorina Capital Advisors AB	-
Permobil AB	2005	2013	Nordic Capital	1
Phadia AB	2004	2007	Triton Partners	-
PIAB Invest AB	2006	2015	Altor Equity Partners AB	2
PIAB Invest AB	2015	2018	EQT Partners AB	-
Powerbox International AB	2013	2018	Alder AB	1
Ramuddenbolagen AB	2014	2017	IK Investment Partners Limited	1
Resurs Holding AB	2012	2016	Nordic Capital	-

San Sac AB	2008	2014	Priveq Investment	1
Scandic Hotels Group AB	2007	2017	EQT Partners AB	3
Securitas Direct AB	2008	2011	EQT Partners AB	-
Semantix AB	2009	2015	Litorina Capital Advisors AB	1
Sveba Dahlen Group AB	2011	2017	Litorina Capital Advisors AB	2
Swedegas AB	2010	2015	EQT Partners AB	-
Sydtotal AB	2007	2012	Priveq Investment	2
Textilia AB	2014	2017	Accent Equity Partners AB	-
Textilia AB	2008	2014	Litorina Capital Advisors AB	1
Thule AB	2007	2014	Nordic Capital	1
Unisport Scandinavia AB	2008	2015	Priveq Investment	2
Wipro Infrastructure Engineering AB	2002	2006	Accent Equity Partners AB	-

Appendix III

List of main data sources

This table summarizes the main sources used in compiling the data set for this study, ranked indicatively in order of relevance. The listed information retrieved is neither collectively exhaustive nor mutually exclusive across the sources used. Selected supplemental sources of information such as Prequin or OMX30 were excluded to ensure adequate conciseness.

Source	Information retrieved	Access type
Retriver Sverige	Statutory accounts, SNI-industry classification, recent management information, CEO personal identity numbers, information on inactive holding companies	Non-public
MergerMarket	PE portfolios and exits, fund vehicle information, transaction details, buy-&-build transactions	Non-public
Amadeus	Historical management information, CEO birth dates, detailed ownership information	Non-public
Capital IQ	Historical financials, historical management information, transaction details	Non-public
Value8	Statutory accounts, holding structures	Non-public
solidinfo	CEO personal identity numbers, historical management information, information on inactive holding companies	Public
PE fund websites	PE portfolios and exits, fund vehicle information, transaction details	Public
Press research	Various	Public

Appendix IV

International buyout fund sample

This table summarizes the 8 buyout funds utilized as control group for the Swedish buyout fund sample (Table II).

Buyout firm name	Foundation	Country origin	Total deals	Portfolio firms	Exited firms	of which Swedish
3i Group Plc	1945	UK	548	48	500	31
Bain Capital, LP	1984	US	103	35	68	2
BC Partners Limited	1986	UK	82	31	51	2
Bridgepoint Advisers Limited	1984	UK	270	62	208	9
Cinven Partners LLP	1977	UK	114	25	89	5
CVC Capital Partners Limited	1981	LU	245	79	166	4
Kohlberg Kravis Roberts	1976	US	142	68	74	2
The Carlyle Group	1987	US	241	82	159	4
Total			1,745	430	1,315	59

Appendix V

OPE sample: Firm-level break-down

This table lists the investments included in the OPE sample.

Company	Beginning obs. period	End obs. period	Owner type	Retirement adj. turnover events
Abrando Aktiebolag	2008	2011	Founder(s) / family	-
Aktiebolaget Aristo	2003	2007	Founder(s) / family	1
AMF Fonder AB	2012	2016	State-owned	1
Arbesko Aktiebolag	2006	2009	Founder(s) / family	-
Areco Steel Aktiebolag	2010	2018	Founder(s) / family	-
Borås Grossist AB	2013	2016	Founder(s) / family	-
Boule Diagnostics AB	2004	2007	Private investor(s)	-
Bra Fritidsprodukter Aktiebolag	2006	2014	Private parent	1
CEOS AB	2008	2015	Founder(s) / family	1
Climat 80 Aktiebolag	2001	2007	Founder(s) / family	-
Climat 80 Aktiebolag	2007	2012	Founder(s) / family	-
Draken i Reftele Aktiebolag	1999	2010	Private investor(s)	-
EDR & Medeso Holding AB	2013	2018	Private investor(s)	1
Elme Spreader AB	2007	2015	Founder(s) / family	-
ELON Group Holding AB	2006	2015	Private investor(s)	1
Emmaljunga Barnvagnsfabrik Aktiebolag	2005	2013	Founder(s) / family	-
ER-t Godis Aktiebolag	2007	2011	Founder(s) / family	-
Expandia Modular AB	2014	2017	Founder(s) / family	-
Fazer Food Services AB	2006	2010	Private parent	1
Fergas Group AB	2011	2016	Founder(s) / family	-
Fergas Group AB	2006	2015	Founder(s) / family	-
Fergas Group AB	2015	2018	Founder(s) / family	-
Fiskeby Board AB	2004	2014	Private parent	-
Frida Utbildning AB	2010	2017	Founder(s) / family	-
Förenade Care AB	2007	2015	Founder(s) / family	-
G. Larsson Starch Technology AB	2007	2012	Founder(s) / family	-
G. Larsson Starch Technology AB	2012	2018	Founder(s) / family	-

Göteborg Energi Gasnät AB	2010	2015	State-owned	1
Hallberg-Rassy Aktiebolag	2006	2012	Founder(s) / family	-
Hardford AB	2010	2019	Founder(s) / family	2
Incoord Sweden AB	2011	2018	Founder(s) / family	1
Interflora Aktiebolag	2002	2007	Private investor(s)	-
International Aluminium Casting, Sweden AB	2008	2015	Private investor(s)	1
Jotex AB	2005	2013	Private parent	2
KB Components AB	2002	2006	Private investor(s)	1
Klintberg & Way Parts AB	2011	2016	Private investor(s)	1
Kungälv's Rörläggeri Aktiebolag	2006	2012	Founder(s) / family	-
Kvadrat Holding AB	2010	2014	Private investor(s)	-
KåKå Aktiebolag	2007	2016	Private parent	-
Liko Aktiebolag	2010	2016	Private parent	1
PEDAB Group AB	2012	2016	Private parent	-
Per-Olof Ejendal Aktiebolag	2005	2015	Founder(s) / family	1
S:t Eriks Ögonsjukhus AB	2005	2010	State-owned	2
Sallén Elektriska Aktiebolag	2006	2010	Founder(s) / family	-
Sibbhultsverken AB	2011	2014	Private investor(s)	-
Skadeservice i Östhammar Aktiebolag	2011	2017	Founder(s) / family	-
SLL Energi & Infrastruktur AB	2008	2011	Founder(s) / family	-
Sportlife M W AB	2012	2017	Private investor(s)	-
Språkservice Sverige AB	2009	2015	Private investor(s)	1
Swegmark Invest Aktiebolag	2012	2015	Private investor(s)	-
Swemac Innovation AB	2011	2016	Founder(s) / family	-
Swemac Innovation AB	2005	2011	Founder(s) / family	-
Svenska BakePartner AB	2011	2017	Founder(s) / family	-
Tage Rejmes Bil Aktiebolag	2007	2014	Founder(s) / family	1
Teknova Byggsystem Aktiebolag	2010	2017	Founder(s) / family	-
Tvättjänst Sverige Aktiebolag	2014	2017	Founder(s) / family	-
Tvättjänst Sverige Aktiebolag	2008	2014	Founder(s) / family	-
Uppsala Vatten och Avfall AB	2008	2014	State-owned	-
VaccinDirekt i Sverige AB	2009	2014	Private parent	-
Winn Hotel Group AB	2007	2017	Private investor(s)	-
Älvsbyhus AB	2005	2007	Founder(s) / family	-
Östberg Group AB	2000	2003	Founder(s) / family	1

Appendix VI

Sample characteristics

This table summarizes selected general as well as financial characteristics in the PE and OPE sample. Matched refers to the number of observations out of the total for each metric that are successfully matched across both samples (PE and OPE).

	PE	OPE	Total	o.w. matched
General				
Exit observations	62	62	124	124
Companies	58	56	114	114
Firm-years	416	416	832	832
Industries (SNI-5)	53	53	106	106
Industries (SNI-2)	14	14	28	28
Financials				
Sales CAGR				
Observations	40	48	88	78
Adj. observations	56	60	116	112
EBIT CAGR				
Observations	34	44	78	66
Adj. observations	46	56	102	88
EBIT margin				
Observations	40	48	88	78
Adj. observations	55	60	115	110

Appendix VIII

Main sample distribution across SNI-industries

This table summarizes the absolute and relative frequency of SNI-industries in the main sample. Notably, the matching logic uses the most granular level 5 SNI-classification while this overview uses the more granular and implicit level 2 classification. This overview only displays the 14 (out of 22) industries featured in the sample included in the classification.

	PE		OPE		Total	
	Obs.	%	Obs.	%	Obs.	%
Manufacturing	23	37%	24	39%	47	38%
Electricity, gas, steam and air conditioning supply	1	2%	1	2%	2	2%
Water supply; sewerage, waste management and remediation activities	-	-	1	2%	1	1%
Construction	5	8%	5	8%	10	8%
Wholesale and retail trade; repair of motor vehicles and motorcycles	17	27%	16	26%	33	27%
Accommodation and food service activities	1	2%	2	3%	3	2%
Information and communication	1	2%	1	2%	2	2%
Financial and insurance activities	1	2%	1	2%	2	2%
Professional, scientific and technical activities	3	5%	3	5%	6	5%
Administrative and support service activities	4	6%	2	3%	6	5%
Education	1	2%	1	2%	2	2%
Human health and social work activities	2	3%	2	3%	4	3%
Arts, entertainment and recreation	1	2%	1	2%	2	2%
Other service activities	2	3%	2	3%	4	3%
Total	62	100%	62	100%	124	100%

Appendix VIII

Company size main sample

This table summarizes relative median financial metrics across the two main samples. The data is based on beginning of holding- (PE sample) or observation period across observations. The timing of observation is not matched chronologically due to the overall sample sizes.

	PE	OPE	% PE
Median net sales	365.1	204.9	56.1%
Quartile 1	143.7	61.8	43%
Quartile 2	294.8	157.8	54%
Quartile 3	570.8	264.9	46%
Quartile 4	3,746.0	682.8	18%
Median EBIT	25.2	10.8	42.9%
Quartile 1	-	2.7	-
Quartile 2	18.0	7.7	43%
Quartile 3	38.3	16.6	43%
Quartile 4	227.0	45.5	20%
Median assets	403.7	111.5	27.6%
Quartile 1	97.1	35.0	36%
Quartile 2	267.3	94.5	35%
Quartile 3	644.9	137.3	21%
Quartile 4	4,758.7	371.5	8%

Appendix IX

CEO turnover frequency (cumulative by deal)

This table summarizes the CEO turnover frequency over time for both the PE and OPE sample. % OPE refers to the relation between turnover frequency between the two samples, given as PE sample CEO turnover as a percentage of OPE sample CEO turnover.

	Obs.	Across observations			Per deal		
		PE	OPE	% OPE	PE	OPE	% OPE
1999	1	1	-	-	1.0	-	-
2000	1	-	1	0%	-	1.0	0%
2001	1	-	-	-	-	-	-
2002	2	-	1	0%	-	0.5	0%
2003	1	2	1	200%	2.0	1.0	200%
2004	2	2	-	-	1.0	-	-
2005	6	6	5	120%	1.0	0.8	120%
2006	8	12	3	400%	1.5	0.4	400%
2007	8	14	1	1400%	1.8	0.1	1400%
2008	6	6	2	300%	1.0	0.3	300%
2009	2	2	1	200%	1.0	0.5	200%
2010	7	8	4	200%	1.1	0.6	200%
2011	7	11	2	550%	1.6	0.3	550%
2012	5	3	1	300%	0.6	0.2	300%
2013	2	2	1	200%	1.0	0.5	200%
2014	2	1	-	-	0.5	-	-
2015	1	-	-	-	-	-	-
2016	-	-	-	-	-	-	-
2017	-	-	-	-	-	-	-
2018	-	-	-	-	-	-	-
Total	62	70	23	304%	15	6	242%

Appendix X

Variable definition

This table summarizes the variables derived from the data collected underlying the various analyses in this study. Regression variables denote the dependent- (A1-2), the independent variables (B1-9). Notably, the regression variables also underpin selected descriptive- and other inferential statistics (with the exception of B6), in addition to the other variables illustrated below (C1-4). The subscripts (C1-3) denote beginning (*t*) and end (*T*) of the relevant observation period.

Index	Variable	Type	Definition
Regression variables			
A1	CEO turnover frequency	Continuous	Cumulative number of turnover events during the holding or observation period, respectively
A2	Binary CEO turnover	Binary	Binary indicator whether an exit or matched OPE observation includes any CEO turnover event
B1	Ownership type (OPE)	Binary	Binary identifier if observation is OPE-backed
B2	Retirement	Binary	Identifier if CEO is in retirement age at turnover event
B3	Horizon	Continuous	Length of observation period in years, based on PE holding period (PE) and matched period for OPE
B4	Firm size (sales)	Continuous	Sales as measure of firm size (see also section 3.2)
B5	Firm size (EBIT)	Continuous	EBIT as measure of firm size (see also section 3.2)
B6	OMX (total) return	Continuous	OMX (stock market) index over relevant horizon (B3)
B7	CEO age	Continuous	Age in years based on date of birth and end of tenure date
B8	Investment vintage	Continuous	Investment year to control for timing bias
B9	Firm age	Continuous	Time since inception of firm in years
Other variables			
C1	Sales CAGR	Ratio	$\left(\frac{Sales_T}{Sales_t}\right)^{\left(\frac{1}{(T-t)}\right)} - 1$
C2	EBIT CAGR	Ratio	$\left(\frac{EBIT_T}{EBIT_t}\right)^{\left(\frac{1}{(T-t)}\right)} - 1$
C3	Delta EBIT margin	Ratio	$\frac{EBIT_t}{Sales_t} - \frac{EBIT_T}{Sales_T}$
C4	Total assets	Continuous	Total assets as measure of firm size (see also section 3.2)

Appendix XI

Variance inflation factor

This table summarizes the output of the analysis of potential multicollinearity issues amongst the variables included in the multivariate regressions. The variance inflation factor (VIF) as well as tolerance (1/VIF) stated for each variable. A generally accepted threshold is a VIF below 10 to conclude that multicollinearity is not a concern. This table illustrates that the sample allows to apply a more conservative threshold of VIF <2.5. For variable definition refer to section 4.1.

Variable	VIF	Tolerance
Sales size	2.41	0.42
EBIT size	2.15	0.47
Horizon	1.36	0.74
OMX (total) return	1.27	0.79
Investment vintage	1.21	0.82
Retirement	1.17	0.86
OPE	1.16	0.86
Firm age	1.13	0.88
CEO age	1.08	0.92
Mean	1.44	0.75

Appendix XII

Entry analysis: CEO turnover by seller type

This table summarizes CEO turnover (both binary turnover and turnover frequency) conditional on the seller type from which the observed companies in the PE sample were acquired. Seller types are ranked by number of exits with CEO turnover.

Seller type	Rank	Exits	Turnover events	per exit	Turnover freq.	per exit	per turn. exit
Privately-owned (founder/-s)	1	19	14	74%	22	1.2	1.6
Financial sponsor	2	18	12	67%	17	0.9	1.4
Corporate	2	20	12	60%	27	1.4	2.3
Privately-owned (others)	4	1	1	100%	2	2.0	2.0
na	4	1	1	100%	1	1.0	1.0
Public	4	2	1	50%	1	0.5	1.0
Merger	7	1	-	0%	-	-	-
Total		62	41	66%	70	1.1	1.7

Appendix XIII

Entry analysis: Founder family departure timing

This table summarizes whether founder CEOs stayed on for the entire holding period, left at entry, or left somewhere during the holding period. The data relates to the observations in the PE sample that featured a founder CEO. Founder CEO is defined as a CEO that is either the founder or part of the owner family at the entry of the PE investor.

Time	Count	% total
Entry year	6	35%
Entry to exit year	6	35%
Stayed on	5	29%
Total	17	100%
% sample	27%	

Appendix XIV

Entry analysis: CEO turnover by buy-in type

This table summarizes CEO turnover by buy-in type. Buy-in types are ranked by number of exits with CEO turnover. MergerMarket buy-in classifications: IBI (institutional buy-in), initiated when a financial institution, such as a private equity firm or venture capitalist, acquires a stake in another company, often in conjunction with a trade buyer. IBO (institutional buyout), similar to an IBI, but in this scenario the financial institution, ordinarily a principal finance house or private equity firm, operates without a trade partner and usually acquires 100% of the target. MBO (management buyout), the acquisition of a company by its incumbent management team which again is usually backed by a venture capitalist or a PE investor.

Buy-in type	Rank	Exits	Turnover events	per exit	Turnover freq.	per exit	per turn. exit
IBO	1	30	19	63%	34	1.1	1.8
MBO	2	20	15	75%	26	1.3	1.7
IBI	3	11	6	55%	9	0.8	1.5
Na	4	1	1	100%	1	1.0	1.0
Total		62	41	66%	70	1.1	1.7

Appendix XV

Holding period analysis: CEO turnover by buyout fund

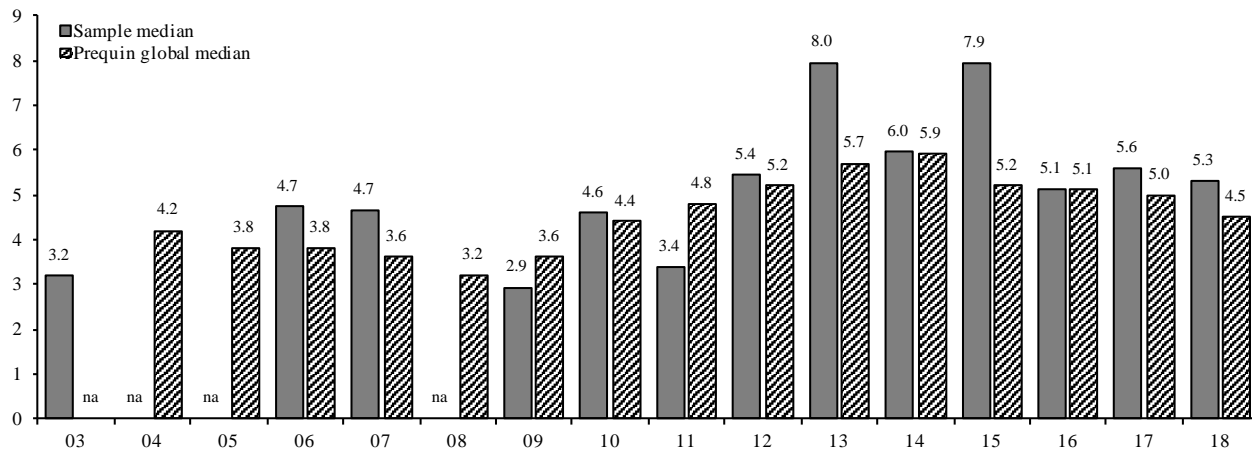
This table summarizes CEO turnover (binary and frequency) over the holding period segregated by buyout funds in the sample. The funds ranked by (i) exits with turnover / exits (ii) number of exits. Experience denotes number of investments by the firm, in line with Gong and Wu (2011).

PE firm	Experience	Rank	Exits	Turnover events	per exit	Turnover freq.	per exit	per turn. exit
Priveq Investment	41	1	7	7	100%	9	1.3	1.3
Altor Equity Partners	68	2	5	5	100%	12	2.4	2.4
Alder	10	3	2	2	100%	4	2.0	2.0
Triton Partners	82	4	5	4	80%	8	1.6	2.0
Segulah Advisor	46	5	5	4	80%	5	1.0	1.3
EQT Partners	208	6	10	6	60%	11	1.1	1.8
Litorina Capital Advisors	38	7	8	4	50%	5	0.6	1.3
Nordic Capital	98	8	6	3	50%	5	0.8	1.7
IK Investment Partners	124	9	7	3	43%	5	0.7	1.7
Accent Equity Partners	68	10	7	3	43%	6	0.9	2.0
Total			62	41	66%	70	1.1	1.7

Appendix XVI

PE sample and global benchmark holding periods

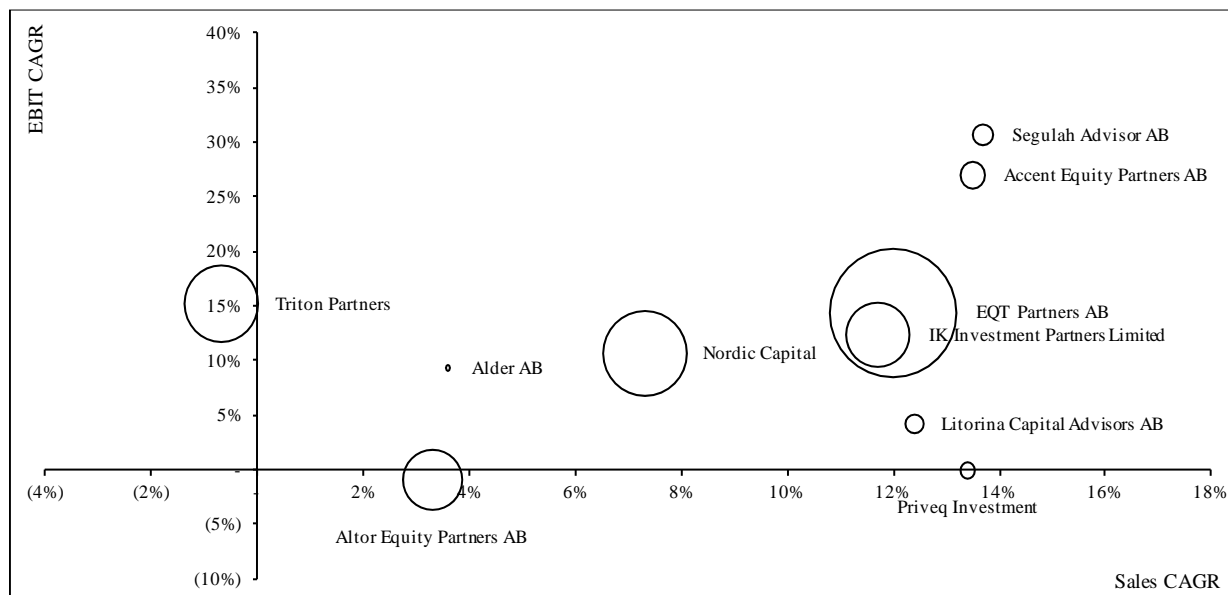
This figure illustrates the median holding period of in our PE sample over time and compares it to the Prequin global median as a benchmark.



Appendix XVII

Financial development (entry-exit year) by fund

This figure illustrates financial development between entry-exit for the observations in our PE sample on a per fund basis (based on the acquiring PE fund). The size of the bubbles denotes funds raised in EURm.



Appendix XVIII

Within sample analysis of financial performance conditional on turnover

This table summarizes the output of several two-sample t-tests analyzing differences in financial performance metrics conditional on CEO turnover in several (sub-) samples. The first column gives the financial metric and sample analyzed for each test (in bold) as well as defines which sub-sample a row relates to (Turnover/No turnover). The remaining columns gives key output of the t-tests. Asterisks denote significance level: 10%-level (*), 5%-level (**), 1%-level (***). Difference and t-stat given as absolute values.

Metric (Sample)	Mean	Variance	Obs.	df	Difference (t-stat)	P> t
Sales CAGR (PE)						
Turnover	0.11	0.04	35	52	0.02	0.61
No turnover	0.13	0.01	21		(0.51)	
Sales CAGR (OPE)						
Turnover	0.06	0.01	19	34	0.01	0.66
No turnover	0.07	0.01	41		(0.45)	
Delta EBIT margin (PE)						
Turnover	0.26	1.94	35	34	0.23	0.34
No turnover	0.03	0.01	20		(0.96)	
Delta EBIT margin (OPE)						
Turnover	0.00	0.00	19	30	0.02	0.16
No turnover	(0.02)	0.00	41		(1.43)	
EBIT CAGR (PE)						
Turnover	(0.06)	0.33	28	44	0.36	0.01
No turnover	0.30	0.11	18		(2.69***)	
EBIT CAGR (OPE)						
Turnover	0.07	0.03	17	50	0.16	0.11
No turnover	(0.10)	0.31	39		(1.64)	

Appendix XIX

Cross-sample analysis of financial performance

This table summarizes the output of several two-sample t-tests analyzing differences in financial performance metrics between observations relating to PE and OPE owned companies across several samples/sub-samples. The first column gives the financial metric and sample analyzed for each test (in bold) as well as defines whether a row relates to observations featuring PE or OPE owned companies. The remaining columns gives key output of the t-tests. Asterisks denote significance level: 10%-level (*), 5%-level (**), 1%-level (***). Difference and t-stat given as absolute values.

Metric (sample)	Mean	Variance	Obs.	df	Difference (t-stat)	P> t
Sales CAGR (Full sample)						
PE	0.12	0.03	56	80	0.05	0.06
OPE	0.07	0.01	56		(1.93*)	
Sales CAGR (Turnover sub-sample)						
PE	0.12	0.08	10	11	0.04	0.66
OPE	0.07	0.01	10		(0.46)	
Sales CAGR (No turnover sub-sample)						
PE	0.14	0.01	14	26	0.04	0.26
OPE	0.11	0.01	14		(1.15)	
Delta EBIT margin (Full sample)						
PE	0.17	1.23	55	54	0.19	0.22
OPE	(0.01)	0.00	55		(1.25)	
Delta EBIT margin (Turnover sub-sample)						
PE	0.77	5.54	10	9	0.79	0.32
OPE	(0.02)	0.00	10		(1.06)	
Delta EBIT margin (No turnover sub-sample)						
PE	0.04	0.01	14	22	0.07	0.01
OPE	(0.04)	0.00	14		(2.80***)	
EBIT CAGR (Full sample)						
PE	0.09	0.28	44	86	0.18	0.12
OPE	(0.09)	0.28	44		(1.58)	
EBIT CAGR (Turnover sub-sample)						
PE	(0.26)	0.50	7	6	-0.28	0.34
OPE	0.03	0.02	7		(1.03)	
EBIT CAGR (No turnover sub-sample)						
PE	0.34	0.12	14	17	0.64	0.02
OPE	(0.30)	0.76	14		(2.53***)	