

Private Equity Fund Managers Going Public

A study of the characteristics of seven listed private equity fund managers

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Abstract

Listed private equity (“LPE”) entities is a relatively new phenomenon and there is little research done regarding LPE entities in general and LPE fund managers in particular. The purpose of this thesis is to investigate if there are any common characteristics for LPE fund managers going public using a sample of seven LPE fund managers. We apply a hypothesis driven approach using both qualitative and quantitative methods. The result of this thesis finds that the key reasons to go public are to fund growth and improve employee incentives. The results indicate that after the IPO, the LPE fund managers get a more diversified investor base, that primarily consist of investors with indicated limited access to limited partnerships rather than existing LPs. We also find that, while fund performance deteriorates significantly post-IPO, fundraising does not increase after the IPO. Moreover, contrary to our expectations, only two of the seven LPE fund managers experienced underpricing the first day of trading. Finally, the results show that the LPE fund managers have a higher exposure to the market than the LPs. We present two main conclusions; (1) the actual reason to go public is for the founders to realize value and (2) investors, with indicated limited access to limited partnerships, are more frequent owners of the LPE fund managers as this is the only – although limited – way for them to get exposure to the private equity market.

Keywords: Listed Private Equity, Private Equity, Performance, IPO

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Definitions

General Abbreviations

IPO	Initial public offering
LPE entities	Listed private equity entities
LPE fund manager	Listed private equity fund manager
GP	General partner
LP	Limited partner
MOIC	Multiple of invested capital
IRR	Internal rate of return
PME	Public market equivalent
CAPM	Capital asset pricing model
FF5	Fama French five factor model

List of Organizational Structures and Examples

Unlisted limited partnership	Nordic Capital and Bain Capital
Listed private equity fund manager	Blackstone and KKR
Listed direct investment company	Ratos and 3i
Listed indirect investment company	Pantheon and Partners Group
Listed fund	HgCapital Trust and Dunedin Enterprise Investment Trust.

LPE Fund Managers

The Blackstone Group Inc.	Blackstone
KKR & Co. Inc.	KKR
Apollo Global Management, Inc	Apollo
Oaktree Capital Group, LCC	Oaktree
The Carlyle Group Inc.	Carlyle
Ares Management Corporation	Ares
EQT AB (publ)	EQT

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1 Introduction

The popularity and investment activity of private equity firms have increased tremendously over time. Private equity has been associated with investors such as high-net worth individuals and institutions, due to restrictions imposed by private equity funds on investment and liquidity levels to become a limited partner (“LP”) (Müller & Vasconcelosb, 2010). Private equity firms have long seen the benefit of private status (Hardymon, et al., 2008), but over the past decade several private equity firms such as Blackstone, Partners Group and KKR went public, allowing any investor to get exposure to private equity (Müller & Vasconcelosb, 2010). However, listed private equity (“LPE”) entities are still a relatively new phenomenon and there is little research done regarding LPE entities in general and LPE fund managers in particular. Although the number of listed private equity firms, organized as LPE fund managers, is small, the topic is still very relevant since some of the largest private equity firms are LPE fund managers.

Previous research has analyzed the advantages and disadvantages for private equity firms to go public as well as the performance of LPE entities in general. However, previous research tends to focus more on public investment companies and public private equity funds, and less on LPE fund managers. With this thesis, we hope to shed light on this organizational structure of listed private equity and its main characteristics. The study can contribute to a further understanding of, and give a more comprehensive view on, LPE fund managers, since no similar study has been conducted to our knowledge.

The purpose of this thesis is to investigate the financial performance as well as characteristics of LPE fund managers, in order to see if there are any commonalities between the LPE fund managers. We have applied a hypothesis driven approach, using both qualitative and quantitative methods. In order to analyze our hypotheses, we have a sample of seven LPE fund managers. To further develop our reasoning, we use data on other funds, public non-private equity firms and the overall private equity market.

In order to explore the subject and reach the purpose of this thesis, we have derived five hypotheses about LPE fund managers through a review of previous research. Hypothesis 1 states that there are three main reasons for the initial public offering (“IPO”); (1) founders’ want to realize value, (2) the LPE fund manager will no longer be dependent on traditional funding and (3) improvement of employee incentives. Hypothesis 2(a) states that the ownership base should be

more diversified, thus there should not be a majority of institutional shareholders in the LPE fund managers. Moreover, hypothesis 2(b) states that many LPs should invest as shareholders in the IPO. Hypothesis 3(a) states that fundraising should increase significantly after IPO. Furthermore, hypothesis 3(b) says that fund performance should deteriorate significantly after IPO. Hypothesis 4 states that a majority of the LPE fund managers should demonstrate IPO underpricing and hypothesis 5 states that the LPE fund managers in our sample should have a higher beta than LPs.

Initially, we look at the stated reasons behind going public and find that the most common reasons of doing an IPO include: funding growth initiatives, expanding employee incentives, realizing value of the equity held by existing owners, as well as general corporate purposes, with funding growth initiatives and employee incentives being the most common.

Then, we analyze the shareholder structure of the LPE fund managers by comparing it over time with similar companies. We also investigate if LPs tend to invest as shareholders at the IPO. We find that, at the quarter of the IPO, the major shareholders are institutions and public investors, while strategic owners only represent a small part. The result also indicates that investors, with suggested limited access to limited partnerships, are more frequent owners of the LPE fund managers compared to existing LPs.

After that, we look at fundraising and fund performance of the LPE fund managers. We analyze growth in AUM and management fees throughout the years and find that, against our expectations, the growth is more aggressive prior to the IPO rather than post-IPO. To further test how the IPO affects size and performance of the funds we run five OLS regressions. We find that while fund performance deteriorates significantly post-IPO, fundraising does not increase after the IPO when compared to the market's or private peers' averages.

In addition, we explore the IPO performance of the seven LPE fund managers. We calculate initial returns and IPO turnover, and compare the results to market benchmarks. While we confirm our assumption about the relationship between underpricing and stock liquidity, we discover that only two LPE fund managers (Blackstone and EQT) demonstrated signs of underpricing at their IPOs. Hence, the results speak against the expectation that most of the LPE fund managers underprice the IPO in order to provide a liquid market for their shares.

As the last step of our analysis, we investigate the long-term stock performance of the LPE fund managers. We run Capital Asset Pricing Model ("CAPM") and Fama-French Five Factor Model ("FF5") regressions and find no significant alphas for all the firms in the sample, confirming

the absence of excess returns. All the market betas, on the other hand, are significant at 0,1% significance level, with the average beta 1,1 for CAPM and 1,0 for FF5. Next, we compare the results to the market betas of publicly traded fund-of funds (proxy for LPs). As expected, we see a significant difference in the market exposures between GPs and LPs.

Finally, we discuss the implications of the analysis performed and present two conclusions. The first conclusion is that the actual, but not always transparently communicated, main reason to go public is for pre-IPO owners (founders in particular) to realize value. Several results speak for this. For example, LPE fund managers tend to time the IPO when growth in the AUM and management fees is high, and when the funds are performing in the top quartile. Moreover, the LPE fund managers in our sample are not growing aggressively after going public, which goes against the “fund growth” motivation stated in their IPO materials. Besides, there is evidence of a number of pre-IPO owners benefitting from the LPE fund manager going public.

The second conclusion is that LPE fund managers get a more diversified investor base after the IPO. Although institutions still represent a large part of the shareholders, it is not only the existing LPs that invests as shareholders in the IPO. Instead it is institutions with indicated limited access to the limited partnerships that have a high demand for LPE fund managers. As we have showed, a public equity investment in an LPE fund manager is a bad proxy for a limited partnership with the same LPE fund manager. However, this could be the only way for these institutions to get exposure to the private equity market.

This thesis is structured in the following way: Section 2 reviews previous research on private equity and listed private equity. Section 3 discusses the institutional background to listed private equity by outlining the history of LPE entities and the organizational structures of listed private equity. Section 4 outlines the sample selection of the LPE fund managers covered in this thesis and Section 5 defines the hypotheses. In order to make the thesis easier to follow, we explain the method, describe the data and show the result for each hypothesis separately in Section 6. Section 7 includes a discussion and interpretation of the results, and the conclusion of the thesis can be found in Section 8.

2 Literature Review

In this section we discuss previous research and literature relevant to the study of the characteristics and financial performance of LPE fund managers. First, we define and describe the private equity market. Second, we review literature that explain the rationale of listed private equity. After that, we discuss the advantages and disadvantages of listed private equity identified by previous research. Last, we cover previous research on the performance of listed private equity and we briefly present research on IPO underpricing of firms in general.

2.1 The Private Equity Market

We define the private equity market in accordance with Døskeland and Strömberg (2018), as investments in unlisted companies by professional investors. The majority of these investments are made by private equity funds which is a financial intermediary that raises funds, usually from institutional investors and high net-worth individuals, and allocates the capital to portfolio companies (Kumpf, 2013). Private equity funds are generally organized as a limited partnership that has a limited investment horizon and are managed by private equity firms (Døskeland & Strömberg, 2018). Usually the private equity firm wants to add value through financial, governance and operational engineering (Kaplan & Strömberg, 2009). The private equity market could be divided into different segments as described in Table 1 below;

Table 1

Segments of the private equity market

This table shows the segments of the private equity market, as shown by Preqin (2016).

Private Equity	Private Debt	Real Estate	Infrastructure	Natural Resources
Buyout	Direct Lending	Private Equity Real Estate	Infrastructure	Energy
Venture Capital	Distressed Debt	Private Equity Real Estate Fund of Funds	Infrastructure Fund of Funds	Agriculture/Farmland
Growth	Mezzanine	Private Equity Real Estate Secondaries	Infrastructure Secondaries	Metals and Mining
Turnaround	Special Situations			Timberland
Other Private Equity	Venture Debt			Water
Private Equity Secondaries	Private Debt Fund of Funds			Natural Resources Fund of Funds
Private Equity Fund of Funds				

According to Døskeland & Strömberg (2018), the different segments of the private equity market share some characteristics. All segments invest in unlisted assets which means that they are illiquid. Moreover, they are active investment strategies since they require screening and due diligence before investing and managing the investments after investing. In the equity segments, the investors usually become active owners. Lastly, limited partnership funds with similar fund structures are usually making the investments.

In this thesis, we will focus on the private equity segment. However, some LPE fund managers such as KKR, Blackstone and EQT have extended their business into other segments such as real estate and infrastructure, which means that these segments indirectly will be covered.

2.2 Listed Private Equity

Cumming et al. (2011) writes that a reason for investing in private equity is that investors want to get priority excess returns of those available in public markets. This has traditionally, however, been done at the expense of liquidity and not being able to rebalance the portfolio when needed. These types of investments have mainly been offered to institutional investors, through private placements. This means that many investors have not been able to do any private equity investments because they have not been able to provide the minimum size of investment, have been lacking liquidity or have not been wholesale investors.

As the institutional private equity market has grown, the number of LPE entities have increased. This have provided public and retail investors an opportunity to achieve the returns that previously had been reserved for large institutional investors in the private market. Cumming et al. (2011) find that investments in LPEs are more common by smaller private pension institutions, institutions with a preference for liquidity, quick access and cash flow management simplicity as well as institutions based in the UK, Switzerland, Sweden and the Netherlands. However, it has also become an alternative investment vehicle for large institutions because of the improved liquidity and lower transaction costs. This implies that institutions can invest in both listed and unlisted private equity vehicles and thereby adjust their exposure to the listed entities as the unlisted limited partnerships draw down commitments.

Gogineni and Megginson (2010) argues that there are three main reasons, traditionally, for firms to go public; (1) easier to raise capital, (2) staff retention and (3) creating incentives by incorporating share options for compensation and advertising. However, the authors argue that

these reasons do not seem to be the main reasons to the listing of private equity firms as these firms typically generate enough cash to pay the employees and do not need the extra publicity. According to the authors, private equity firms go public because they do not want to depend solely on traditional funding sources. Moreover, going public is the only way for a private equity firm and its founders to realize value since limited partnerships are highly illiquid and the secondary market for private equity investments is still in its early stages.

Kumpf (2013) writes that the reason for the listing of private equity firms is often the founders' wish to reduce their stake. Another reason is the need for a broader investment base to attract more capital.

McElhaney (2019) argues that LPE entities grew by expanding the product range, from having 2,5 unique strategy offerings each to have 8 strategy offerings after going public, compared to the unlisted firms that, during the same time period, went from 1,5 to 2,3 strategy offerings. The author argues that the increase in strategy offerings shows the public desire to diversify the business as well as growing AUM and the accompanying management fees.

2.3 Advantages and Disadvantages of Listed Private Equity

2.3.1 From the Perspective of Listed Private Equity Entities

A lot of the previous research have discussed the advantages and disadvantages of LPE entities going public. Copper-Evans (2010) argues that one of the advantages is that LPE entities are a permanent structure with no need to return capital to investors compared to a fixed-life limited partnership fund. Moreover, LPE entities have the flexibility to change its investment strategy since it is not driven by time.

Hudson (2019) states that LPE entities gain access to unlimited capital that they can use to invest in their underlying funds as GP commitment instead of having to put in their own money. Moreover, they can provide more money to a portfolio company without having to do a drawdown from investors. In addition to this, by listing on an exchange, LPE entities no longer have to be restricted by the type of investor they can accept since anyone can become an investor. This increases the number of shareholders and potential investors. Doing an IPO is also a fast way of building reputation and brand recognition. Hudson (2019) also writes that LPE entities could use public funds to purchase the portion of the company that is currently held by investors if the

manager does not want to exit, but instead hold on to the company for a few more years. Lastly, it is a way to improve employee incentives since every employee has a chance to buy shares or receive options that vest over time. However, since asset managers are able to cornerstone their funds, more skin in game from the management side is provided. On the other hand, it could create a conflict of interest between the fund manager as an investor and as the manager of the investment. Another conflict of interest that could arise is between shareholders in the management vehicle and investors in the underlying fund which forces the fund manager to compromise between them.

Moreover, apart from public listing costs, there are other expenses connected with being publicly traded. For example, Lundström & Saucedo (2010) write about overhead and administrative costs emerging as a result of the disclosure and transparency requirements.

2.3.2 From the Perspective of Investors

According to Investment Week (u.d.), investing in an LPE entity gives shareholders immediate exposure to a portfolio of private equity that is well diversified by geography, sector and vintage. Another advantage is the potential to buy LPE entities at discounts to the net asset value (“NAV”) when the short-term sentiment is bearish on the asset class.

Kumpf (2013) writes that one of the main advantages of LPEs is higher liquidity which gives investors an opportunity to rebalance their portfolios when necessary. As a result, the investor can maintain their exposure to private equity when receiving realizations from a limited partnership. Moreover, smaller institutions and private pension funds are able to invest in private equity as no capital requirements exists and the search costs for the LPE entity is lower. However, a disadvantage is a potential agency conflict from managers benefitting from the lock-in capital and not being forced to raise additional funds promoting past performance.

Cumming (2011) argues that investing in LPE entities has two main advantages; (1) investors can achieve relatively rapid exposure to private equity through listed vehicles, and (2) having LPE exposure together with private placements creates an adjustment mechanism that is dynamic to handle the private equity exposure of the investor.

Copper-Evans (2010) argues that one of the advantages of the LPE entities is transparency. It is also supported by Bergmann et al. (2010) who argues that since LPE entities have to fulfill strict requirements when listing on a stock exchange, the transparency is significantly higher than unlisted funds and private equity firms.

Lundström & Saucedo (2010) writes in their study that LPE entities enable all investors to invest in private equity and not only institutional investors, as the requirements on investment size is lower. A disadvantage of LPE entities is that the correlation with stock markets tends to be higher than for unlisted private equity.

Other disadvantages are described by Phillips (2008), who argues that some investors tend to avoid investing in LPE entities because they may hold a lot of cash that earns an interest rate instead of private equity returns. He also argues that the valuation of the underlying assets is hard as many quoted vehicles trade at a discount to NAV. Having an asset that is valued conservatively may result in the investment being realized with a double discount. In addition, LPE entities do not provide access to the underlying assets and are more correlated with the public equity market and less with private equity.

Moreover, according to Kumpf (2013) one argument for not investing in LPE entities is that the cash management is not as efficient as when investing in an limited partnership, where cash is drawn down when needed for an investment and returned after a divestment. A second argument is that the proceeds usually are more favorably taxed. Third, LPs can sometimes get co-investment rights to invest directly and in parallel with the limited partnership.

Lastly, another potential disadvantage of LPE entities for shareholders lies in the outsized control of many founders and insiders. Typically, LPE's common shares have no voting rights. Hence, shareholders can be excluded from certain designations (Gelfer, 2018).

Table 2 below shows a summary of previous literature on motivations, advantages and disadvantages.

Table 2**Summary of previous literature**

The table summarizes the previous literature on motivations to go public as well as advantages and disadvantages of LPE entities outlined in Section 2.2 and Section 2.3.

	Motivations	Advantages	Disadvantages
Perspective of Private Equity Entities	Not depend solely on traditional funding sources and a more diversified ownership base	Permanent capital structure which also reduces pressure to exit investments	Conflict of interest between the fund manager as an investor and as the manager of the investment
	Realize value for founders and the firm	Unlimited capital that can be used to invest in underlying funds as GP commitment	Conflict of interest between shareholders and investors
	Improve employee incentives	Flexibility to change investment strategy	Public listing costs
	Build reputation and brand recognition	Provide more money to portfolio companies without having to do a drawdown from investors	Disclosure and transparency requirements
	Business diversification	No longer restricted by the type of investor since anyone can become an investor	
Perspective of Investors	n.i.	Higher liquidity which gives an opportunity to rebalance the portfolio when needed	Agency conflict from managers benefitting from the lock-in capital
		Potential to buy LPE entities at discount to NAV	Correlation with stock markets tend to be higher than for unlisted private equity
		Immediate exposure to private equity	LPE entities may hold cash that earns an interest rate
		No capital requirements exist and lower search costs	Valuation is hard since LPE entities trade at a discount to NAV
		Transparency	Proceeds favorably taxed in a limited partnership No co-investment rights No voting rights

2.4 Performance of Listed Private Equity

2.4.1 Financial Performance of Listed Private Equity

There is some research made on the performance of LPE entities. Gogineni and Megginson (2010) writes that both Blackstone Group and Fortress Group had a strong performance during the first days after their IPOs. However, the share price later dropped below the offer price, and they underperformed relative to market benchmarks in the first months after their IPOs. However, 3i Group outperformed the industry benchmarks during most of the time after their IPO. The authors argue that the short-term underperformance of both Blackstone and Fortress is driven by the market conditions of the time, since stock markets took a hit in the beginning of 2007. The authors find that the initial evidence of the success of LPE stock market performance is not encouraging but argues that the general economic conditions have played a crucial role. Moreover, they write that the evidence of the good long-run performance of 3i Group implies that it is too early to discount LPE shares.

Fernyhough and Klees (2019) shows that the absolute performance of private equity funds has been on a downward trend. As a result, it is more difficult to earn carried interest and consequently, GPs are incentivized to grow the capital in order to grow the base for management fees. Moreover, the authors find that LPE entities have performed better than their private peers when looking at the internal rate of return (“IRR”) and marginal outperformance when using public market equivalent (“PME”).

Kumpf (2013) writes that LPE vehicles usually performed better (worse) than standard equity indices when the market was in an upswing (downswing).

2.4.2 Short-run Underpricing

The phenomenon of pricing an IPO below its market value is called underpricing. To our knowledge, there is little research done on IPO underpricing of private equity firms in particular. However, underpricing of IPOs in general have been widely researched. Many researchers have documented that the share price in an IPO tends to jump significantly on the first trading day irrespectively of the period, country or industry (Croes, 2017). The increase in the first day market

price from the offer price indicates that the market values the shares higher than the offering price, and are thus willing to place higher bids to purchase the shares (Kallén & Björkqvist, 2018).

Even though underpricing is proved to be a persistent feature of the IPO market, the existing literature doesn't provide a unanimous explanation for this anomaly. According to Ritter and Welch (2002) there is no single dominant theoretical cause for underpricing. They argue that it is more a matter of the relative importance of different models rather than a matter of which model is right. One reason can be of more importance for some firms or at certain times.

Several research papers, including Booth and Chua (1996) and Reese (1998), notes a relation between the magnitude of initial return and trading volume in the first few days after the IPO. According to Yüksel and Yüksel (2006), one of the popular explanations for the relationship between underpricing and trading volume is that underwriters have an incentive to underprice since high trading activity leads to higher trading profits for them in the aftermarket. Another explanation is provided by Zheng et al. (2005) who argues that pre-IPO shareholders underprice the issue to establish a liquid market for their shares.

Worth mentioning is that a trading activity observed during the first few days after an IPO are atypical for all IPOs regardless if they are underpriced or overpriced. Krigman et al. (1999) writes that the heavy first-day trading puts many IPO firms on the list of the largest volume stocks for the day. The first day adjusted trading volume within their sample represent a minimum of 1%, a median of 33%, and a maximum of 209% of shares offered. However, they note that the volume quickly dissipates. Similarly, the link between IPO underpricing and high liquidity for issuing firms may also be a temporary phenomenon.

Another thing to look at is conditional underpricing described by Ritter (2011). According to him, if the offer price is revised down from the midpoint of the original file price range there is on average very little underpricing. However, if it is revised upwards, the underpricing is on average fairly severe. Therefore, the adjustment of the offer price may be used to predict the first-day return, a pattern that is known as "the partial adjustment phenomenon".

3 Institutional Background

This section will first outline the history of listed private equity and will thereafter describe the different organizational structures of listed private equity.

3.1 History of Listed Private Equity

The United States of America (“US”) have historically had limited experience with listed private equity firms, while Europe on the other hand have a long history of listed private equity firms. The large private equity firm 3i went public already in 1994 (Hardymon, et al., 2008). Many private equity firms went public in the last decade and by doing that, investors got an opportunity to get exposure to private equity through buying the shares on an exchange (Kumpf, 2013).

During the global financial crisis in 2008, banks were reluctant to lend to private equity firms because of the risk of bad credit. Because it was difficult to use traditional sources for fundraising, private equity firms started looking for alternative funding sources such as listing the shares on stock markets to attract investments from passive investors (Cumming, et al., 2011). Thus, the private equity firms replaced portfolio company debt with funds raised from the public.

Since the crisis, the private equity industry has benefitted from long-term trends. The Dodd Frank Act, which is a regulation for investment banks, forced them to close many trading and investment businesses to reduce risk-taking. The private equity firms could take advantage of this since they were better positioned to handle risk because of their low leverage and long lock-up periods (Gara, 2020). Besides, investors are seeking higher returns as the global economy stumbled in 2019, increasing the interest in private equity. This escalated the growth in dry powder and boosted assets under management (“AUM”) to a record \$4,11tn as of June 2019 (Preqin, 2020) .

Since the implementation of US tax reforms in 2018, large LPE fund managers such as KKR, Blackstone and Apollo have converted to C-Corp (Gelfer & Fernyhough, 2019; Lewis, 2019). The main reason for the transition is that the LPE entities’ shares are undervalued because of their complex financials, they are excluded from public indices and mutual funds as well as the hassle of filing K-1s. The switch is also believed to make it easier for domestic and international investors to own the stock, as well as mutual funds and passive investors (Gelfer & Fernyhough, 2019). This resulted in marginally higher tax bills but broadened their potential investor base.

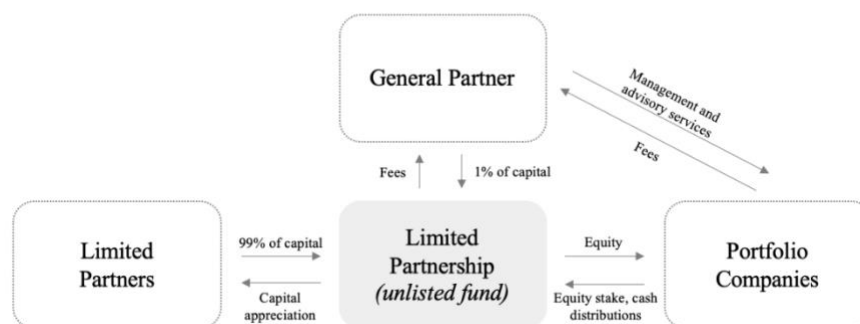
Since then, the stocks of these firms soared, attracting a larger interest to the asset class and making the year of 2019 one of the best year for private equity firms. In the recent COVID-19 outbreak, the markets observed a shift of power in the financial system on March 5, 2020. Blackstone, the world's largest private equity firm (\$600 bn AUM) became the second most valuable standalone investment firm on Wall Street (after BlackRock), overtaking the investment bank Goldman Sachs in market capitalization (Gara, 2020).

3.2 Organizational Structures of Private Equity

3.2.1 Unlisted Limited Partnership

The unlisted limited partnership or limited liability corporation shown in Figure 1 is the most common way of investing in private equity. The general partner ("GP") set up the limited partnership and provide approximately 1% of the capital, whereas the rest is raised from institutional investors and high net-worth individuals. The limited partnership usually has a life of 10 years where the LPs receive the capital appreciation of the GPs investments in portfolio firms, after compensating the GP through management and performance fees (Kumpf, 2013). Examples of private equity entities with this structure is the Swedish private equity firm Nordic Capital and US private equity firm Bain Capital.

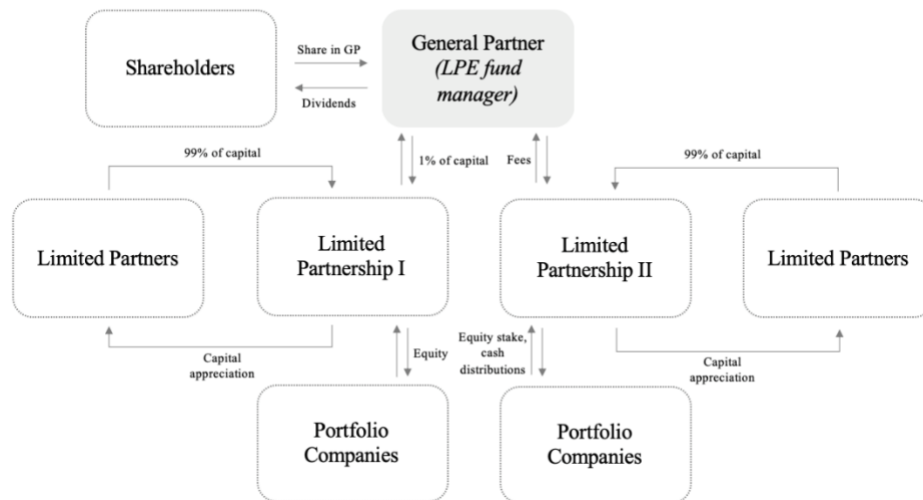
Figure 1
Organizational structure of unlisted limited partnership based on Kumpf (2013)



3.2.2 Listed Private Equity Fund Managers

According to Cumming et al. (2011), LPE fund managers usually have no direct or indirect exposure to the private portfolio companies. In Figure 2 we show that they instead have an acquired interest in managed limited partnerships. This means that investors buy an interest in the GP who manages unlisted limited partnerships. The investors does not earn a direct return on the portfolio company investments, but will instead receive dividends that are a function of the management and performance fees (Kumpf, 2013). The structure is similar to the unlisted limited partnership structure in Section 3.2.1, except that the investors buy a listed interest in the GP and not an unlisted limited partnership interest (Cumming, et al., 2011). Examples of private equity entities with this structure are Blackstone and KKR. LPE entities with this organizational structure are the focus of this thesis.

Figure 2
Organizational structure of LPE fund managers based on Kumpf (2013)

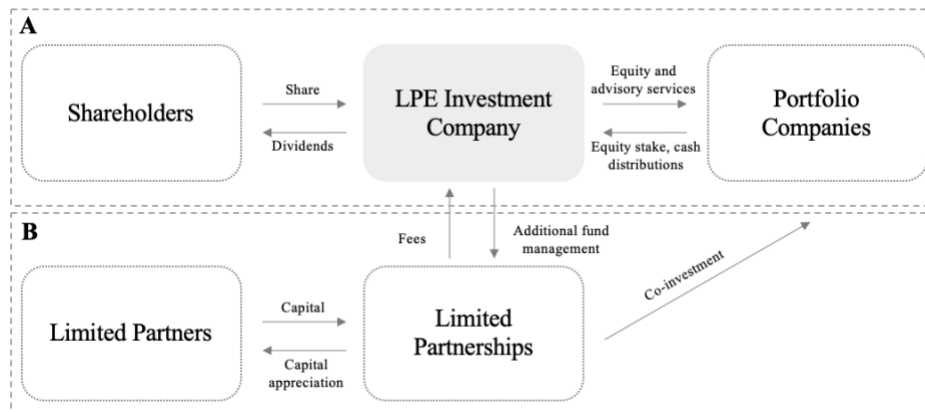


3.2.3 Listed Direct Private Equity Investment Companies

Listed direct private equity investment companies give a direct exposure to the private portfolio companies. This structure is according to Bergmann et al. (2010) the most common organizational structure. Usually the LPE investment companies consolidate the portfolio companies as subsidiaries and invest through their own balance sheet (box A Figure 3). The LPE investment companies pay their shareholders dividends occasionally. Furthermore, some LPE investment

companies run limited partnerships that co-invest in the same portfolio firms, which results in that shareholders not only participate in the capital gain of the direct investments but also get a share of management and performance fees (box B in Figure 3) (Kumpf, 2013). Examples of private equity entities with this structure are the Swedish investment company Ratos (box A in Figure 3) and 3i Group from the UK (box A + B in Figure 3).

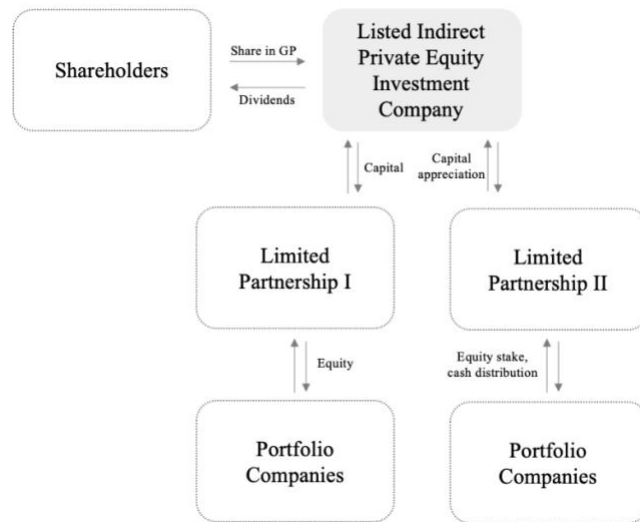
Figure 3
Organizational structure of LPE investment companies based on Kumpf (2013)



3.2.4 Listed Indirect Private Equity Companies (Listed Fund-of-Funds)

As shown in Figure 4 below, listed fund-of-funds commit capital to several unlisted limited partnerships or listed funds (Kumpf, 2013). These does not invest capital directly in private equity but indirectly through limited partnerships. This means that an investor buys an interest in the listed company and indirectly owns a portfolio of limited partnerships that are diversified across for example regions, industries and vintages (Cumming, et al., 2011). Examples of this is the UK-based Pantheon International PLC and the Swiss-based Partners Group.

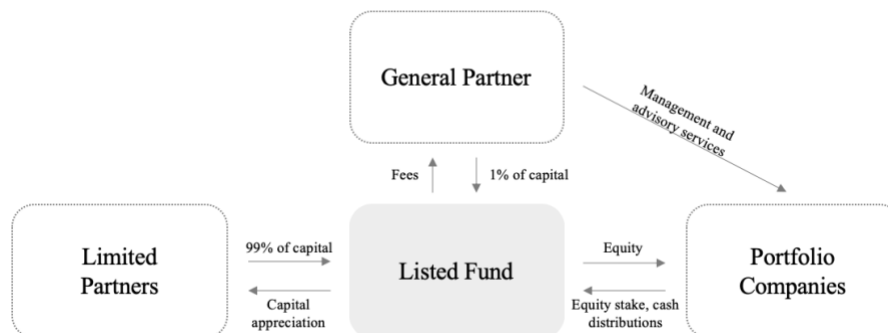
Figure 4
Organizational structure of listed fund-of-funds based on Cumming et al. (2011)



3.2.5 Listed Private Equity Funds

According to Kumpf (2013), listed private equity funds shown in Figure 5 below, are similar to the unlisted limited partnership described in Section 3.2.1 except that the fund has an infinite life. The managers can therefore be less concerned with the performance and reputation since they do not have to worry about future fundraising rounds. Instead of distributing the capital gains of the investments to the investors, dividends are paid. Examples of listed private equity funds are HgCapital Trust and Dunedin Enterprise Investment Trust.

Figure 5
Organizational structure of listed private equity funds based on Kumpf (2013)



4 Sample Selection

LPE fund managers (defined in Section 3.2.2) is a fairly recent phenomenon that represents a small part of the LPE universe. Hence, it has been covered to a lesser extent by existing literature compared to the other organizational structures. However, some of the largest private equity firms, like Blackstone, are classified as LPE fund managers and represents an interesting research topic. Therefore, in this thesis, we focus on investigating common characteristics between LPE fund managers as well as their financial performance.

Our research is based on a sample of seven private equity firms that are classified as LPE fund managers. The sample selection process began with the Preqin PE Database screening that resulted in a list of 92 currently investing LPE firms (excluding venture capital). However, the list was not exhaustive, as some data was not up to date (EQT was classified as unlisted). Therefore, we expanded the selection with the companies mentioned in existing literature and online sources, and manually screened annual reports and companies' websites for selected criteria.

As a general rule, we only chose companies, who primarily act as the GP, or, in other words, whose revenue mainly comes from management and performance fees. This criterion is the reason for many companies to be excluded, as most of them had other organizational structures (explained in Section 3.2). Other reasons for companies to be excluded are: (1) insufficient disclosures (i.e. few funds reported) or inaccessibility of data (especially in emerging markets), (2) low trading volumes and (3) change in ownership status (some LPE entities got delisted or have been bought out). Even though the last criterion applies for Oaktree (Oaktree was acquired by Brookfield Asset Management Inc. in September 2019), we include it in the sample as the transaction is relatively recent and the track record of seven years is sufficient for our analysis.

As a result, after imposing restrictions regarding the level of detail required, we have a sample of seven LPE fund managers. The IPO summary for the LPE fund managers in our sample is shown in Table 3 below.

Table 3
IPO summary of the LPE fund managers included in this thesis

The table shows the IPO summary for each of the PE fund managers in our sample. The numbers are stated excluding overallotment shares.

	Blackstone	KKR*	Apollo	Oaktree	Carlyle	Ares	EQT
Ticker	BX	KKR	APO	OAK	CG	ARES	EQT
Date of IPO	22-Jun-07	15-Jul-10	30-Mar-11	12-Apr-12	3-May-12	2-May-14	24-Sep-19
Stock exchange	NYSE	NYSE	NYSE	NYSE	Nasdaq - GS	NYSE	Nasdaq Stockholm
Offer price	31	10.5	19	43	22	19	67
Currency	USD	USD	USD	USD	USD	USD	SEK
Shares offered	133 333 334	n.i.	29 757 559	8 843 023	30 500 000	11 363 636	190 596 780
<i>by Company</i>	133 333 334	n.i.	21 500 000	7 888 864	30 500 000	11 363 636	86 634 900
<i>by Shareholders</i>	0	n.i.	8 257 559	954 159	0	0	103 961 880
Shares outstanding	234 667 568	204 902 226	120 972 042	30 579 510	30 500 000	80 441 870	952 983 900
Total shares **	1 081 465 655	683 007 420	360 972 042	150 848 263	304 500 000	211 363 636	952 983 900
% of the firm sold at the IPO	12,3%	n.i.	8,2%	5,9%	10,0%	5,4%	20,0%
Gross Offering Amount (mm)	4 133	n.i.	565	380	671	216	12 770
Underwriter Compensation (mm)	176	n.i.	34	18	32	11	n.i.
Total Net Proceeds (mm):	3 958	n.i.	531	362	639	205	n.i.
<i>to Company</i>	3 958	n.i.	384	322	639	205	n.i.
<i>to Shareholders</i>	0	n.i.	147	40	0	0	n.i.
Market Cap at the IPO (mm)	33 525	7 172	6 858	6 486	6 699	4 016	63 850

* KKR initially listed shares of KKR & Co. (Guernsey) L.P. on the Euronext Amsterdam in 2006. After KKR merged with KKR Guernsey in 2009, the merged company's shares ceased trading in Amsterdam on July 14, 2010 and began trading on NYSE on the next day, at \$10,5 per share. Guernsey stockholders swapped their holdings for U.S.-listed stock.

** if all outstanding partnership shares held by the existing owners were exchanged for newly issued common shares on a one-for-one basis.

5 Hypotheses

In this section we develop our hypotheses regarding the characteristics and performance of LPE fund managers. By reading existing literature and research that covers listed private equity, we found several characteristics of LPE entities. Since some of the largest private equity firms are publicly traded fund managers, we think it is interesting to investigate the reasons why they go public and if the characteristics identified in previous research apply for them. Moreover, we want to see how the LPE fund managers perform after the IPO as well as if the common phenomenon of underpricing at the IPO occur for the LPE fund managers.

Our hypotheses are the following:

H1: There are three main reasons for the IPO; (1) founders' want to realize value, (2) the LPE fund manager will no longer be dependent on traditional funding and (3) improvement of employee incentives.

The hypothesis is built on the most common reasons for why private equity goes public that we outlined in the literature review in Section 2. This hypothesis is supported by Gogineni & Megginson (2010) who write that common reasons for IPOs does not apply to private equity firms to the same extent as these firms typically generate enough cash to pay its employees and does not need the extra publicity. Instead the reasons are to diversify themselves from traditional funding sources and to make it possible for founders to realize value. However, from other studies such as Hudson (2019), some of the typical reasons for IPOs such as the introduction of a new employee incentive structure still seems to be one reason why private equity firms chose to go public.

H2 (a): The ownership base should be more diversified after the IPO, thus there should not be a majority of institutional shareholders in the LPE fund managers.

Since the IPO enables all investors to invest in private equity, we believe that there also should be investments from the public which reduces the institutional investors shares of the LPE fund manager. This is supported by Lundström & Saucedo (2010) who writes that all investors can invest in listed private equity as the requirements on investment size is lower. Moreover, Kumpf

(2013) argues that smaller institutions and private pension funds are able to invest in private equity since LPE entities has no capital requirements and that the search costs are lower.

H2 (b): Many LPs should invest as shareholders in the IPO.

The reasoning behind this hypothesis is that LPs might want to invest in LPE entities since they understand the stock better and/or has an intention to build a relationship with the GP. In addition to this, an LP can maintain exposure to private equity when receiving realizations from a limited partnership (Kumpf, 2013) or when it draws down commitments (Cumming, et al., 2011).

H3 (a): Fundraising should increase significantly after the IPO. This includes: (1) growth in AUM, (2) growth in management fees and (3) growth in fund sizes.

According to Phillips (2008), the stock price performance of an LPE entity depends on whether the company can keep lucrative fees rolling in. Therefore, in the hopes of pleasing shareholders, LPE entities are aggressive in increasing fund sizes to boost management fees and potential carried interest (McElhaney, 2019). This hypothesis is also supported by a study from Fernyhough and Klees (2019), who states that performance fees are more difficult to earn because the absolute performance of private equity funds has been on a downward trend. Consequently, GPs are incentivized to grow the AUM in order to grow the base for management fees.

H3 (b): Fund performance should deteriorate significantly after IPO.

The hypothesis is based on the idea of a tradeoff between the growth in the fee base and the funds' performance that LPE fund managers face. Hudson (2019) writes about a conflict of interest that can arise when interests of shareholders in the management vehicle differ from the LPs, forcing the fund manager to compromise between the two. In other words; is the manager working for its fund's carried interest or their quoted manager share price? A study from Fernyhough and Klees (2019) also raises the question whether the focus on management fees, strategy expansion, and short-term profits can lead to worse long-term performance for the flagship buyout funds of the LPE entities compared to the non-listed private equity firms. They argue that the pressures of answering to public shareholders can lead to short-term actions and inefficiencies.

H4: The majority of LPE fund managers should demonstrate IPO underpricing.

Usually there is a tradeoff between the underpricing and trading volumes: severe underpricing leads to money left on the table, but in exchange there is an excitement about the stock that provides a more liquid aftermarket. On the contrary, firms who price their stocks too high might see a drop in the price the first day and a negative effect on liquidity. Zheng et al. (2005) writes that one of the explanations for this relationship can be that pre-IPO shareholders underprice the issue to establish a liquid market for their shares. As we mentioned previously, one aspect of LPE entities is providing liquid exposure to the asset class. Therefore, if we assume that LPE fund managers also demonstrate a positive relationship between underpricing and liquidity, we should expect most of them to underprice at the IPO in order to make their stock more liquid.

H5: The LPE fund managers in our sample should have a higher beta than limited partners.

This hypothesis is based on the split of the total cash flows. The GP gets the carry and should therefore have a high beta. The reasoning behind this is that if the market performs well, it will affect the GPs cashflows more than the LPs cash flows on average. The LP gets the rest of the cash flows after the carry, which implies a lower beta.

6 Analysis of LPE Fund Managers

In this section we explain the method, describe the data and show the result for each hypothesis separately in order to make the thesis easy to follow. The main reason for this is that the method and data used is different for each hypothesis.

6.1 Reasons for Going Public

In this section we investigate hypothesis 1 covering the reasons why LPE fund managers go public. Our hypothesis is that there are three main reasons for the IPO; (1) founders' want to realize value, (2) the LPE fund manager will no longer be dependent on traditional funding and (3) improvement of employee incentives.

6.1.1 Methodology

To analyze hypothesis 1, we use a qualitative method. We have gone through the LPE fund managers' prospectus at the IPO to find the reasons and motivations for the IPO. The reasons have been written down for each LPE fund manager and we have thereafter counted them to get the most common reasons to why LPE fund managers choose to go public.

A limitation is that the information is retrieved from the IPO prospectus which is written by the LPE fund managers themselves. A potential risk is that the LPE fund managers have excluded important information regarding the reasons to go public, which could bias our results.

6.1.2 Data Description

The data source used for this hypothesis is the LPE fund managers' prospectus. We have created our own dataset, by withdrawing relevant information, which contains the reasons why the LPE fund managers went public. Please see Annex A for a full list of reasons.

6.1.3 Result

Table 4 below shows the reasons listed in the LPE fund managers' prospectus. The most common reason for the IPOs is to fund growth initiatives. Second, being a listed company is a way to expand employee incentives. The third most common reason is realizing value of the equity held by existing owners as well as general corporate purposes. The former is supported by the data in Table 3, where three companies (EQT, Apollo and Oaktree) were selling some secondary shares at the IPO. However, EQT does not directly mention this reason in their prospectus. A reason for their sell-off might be to create a free float that is large enough (Investor AB, 2019).

Table 4
Reasons for doing an IPO

The table below describes the main reasons for doing an IPO by using information in prospectus as well as annual reports. The column other includes reasons such as capital market access (EQT), transparent governance structure (EQT) and repayment of outstanding balances under credit facility (Ares).

Firm	Reasons							
	Fund growth initiatives	Enhance brand	Currency for acquisitions	Expand employee incentives	Realize value of the equity held by existing owners	Broaden ownership base	General corporate purposes	Other
Blackstone	x	x	x	x	x			
KKR	x		x	x				
Apollo	x				x		x	
Oaktree	x				x			
Carlyle	x			x			x	
Ares	x			x			x	x
EQT	x	x		x		x		x
Total	7	2	2	5	3	1	3	2

6.2 Ownership Structure

In this section we investigate hypothesis 2(a) covering the ownership structure, suggesting that the ownership base should be more diversified after the IPO, thus there should not be a majority of institutional shareholders in the LPE fund managers. We will also cover hypothesis 2(b) which states that many LPs should invest as shareholders in the IPO.

6.2.1 Methodology

The qualitative analysis of the LPE fund managers' ownership structure is based on shareholder data at the quarter of the IPO as well as one year after the IPO, three years after the IPO and today (as per 31.12.2019). The shareholders are classified in four main groups with inspiration from the definition in Capital IQ, as outlined in Table 5 below. We have compared the ownership structure of the LPE fund managers to comparable listed firms in order to identify any differences. The holdings are divided by the number of shares outstanding of each firm at the respective dates to get the percentage. This is done in order to compare both the LPE fund managers against each other, as well as the LPE fund managers against the average of their comparable firms. Please note that the group public/other is a residual, as defined by Capital IQ.

Table 5

Classification of shareholder groups

The table lists the shareholder groups under four main categories, with inspiration from Capital IQ. However, we have chosen to present individuals/insiders as its own category for illustration purposes. Public/other is a residual post, calculated by subtracting institutional, individuals' and strategic owners' ownership from the market capitalization.

Institutions	Individuals/Insiders	Strategic owners	Public/other
Institutions	Individuals/Insiders	Strategic owners	Public/other
Traditional Investment Manager		Corporations (Public)	
Bank/Investment Bank		State Owned Shares	
Hedge Fund Manager		ESOP	
Family Offices/Trust		Educational/Cultural Endowment	
Corporate Pension Sponsors			
Insurance Company			
Sovereign Wealth Fund			
Government Pension Sponsor			
Unclassified			
REITs			
Union Pension Sponsor			
Charitable Foundation			

The LPs in the funds, with vintage years between the IPO date and 10 years before the IPO, are matched with shareholder data at the quarter of the IPO as well as today (as per 31.12.2019). This is done in order to identify investors that are both LPs and shareholders.

A potential limitation is the use of quarterly data in the shareholder analysis. As a consequence, we may miss relevant information regarding the trading of the share on the day of the IPO. Quarterly data was the only data available to us. However, we believe that it is representative enough to answer the hypothesis regarding a more diversified ownership base.

Furthermore, the classification of shareholders in Capital IQ have limited us since we cannot capture all investors (e.g. private investors such as the China Investment Corporation in Blackstone). Moreover, due to the classification we have not been able to access the historical free float of the LPE fund managers. We are a little suspicious about the classification, e.g. there are few strategic owners and different asset classes are not taken into account. However, due to the lack of data available on shareholders, we have chosen to use the classification from Capital IQ.

A third limitation is the use of two different datasets, LPs from Preqin and shareholders from Capital IQ. Since the investor names are not written in the same way, we have been forced to manually go through the datasets which could involve the risk of human bias on the results.

6.2.2 Data Description

Shareholder data for the LPE fund managers and the comparable firms have been retrieved from Capital IQ. The dataset created is used for analyzing the shareholder structure and contains the shareholder data for both the LPE fund managers in our sample and their comparable firms. We have identified five comparable firms for each LPE fund manager using four criteria; (1) being listed on one of the major exchanges, (2) IPO date is one year before or after the LPE fund manager's IPO date, (3) similar transaction values and (4) sufficient information provided. Only firms that are listed today are included. The list of the comparable firms is shown in Annex B.

Data on LPs is retrieved from Preqin, and thereafter combined with the shareholder data from Capital IQ. As a general rule, only funds with a vintage year of maximum 10 years before the IPO date is included. The reason for this is limited access to fund information, which made it difficult to set up a timeline for each fund before the IPO. However, since funds usually have a life of approximately 10-12 years, we analyze the LPs using funds with a vintage year of 10 years as a proxy.

6.2.3 Result

This section presents the shareholder structure of the LPE fund managers, both at the quarter of the IPO as well as over time. We will also analyze if LPs tend to invest as shareholders. Please note that the following two tables represent the public ownership, and therefore not the total shareholdings. This means that there may be other entities, i.e. private investors, that are not shown in these statistics.

Table 6 below shows the public ownership structure at the quarter of the IPO for each LPE fund manager in our sample, as well as the average for their comparable firms. At the quarter of the IPO, we can see that it is institutions and the public that are the main shareholders for the LPE fund managers. This indicates a more diversified investor base as public investors now invest in private equity vehicles. Moreover, compared to the average of comparable firms, the LPE fund managers seem to have a low percentage of strategic owners. This means that investors such as private and public corporations usually do not invest in listed private equity.

Table 6

Ownership structure at the IPO (%)

The table below shows the ownership structure at the quarter of the IPO for the LPE fund managers and its comparable firms in percent. The public ownership is calculated as a residual by subtracting institutional owners, individuals and strategic owners from the total shares outstanding.

Firm	Institutions	Individuals/Insiders	Strategic Owners	Other/Public
Blackstone	17,06%	0,00%	0,01%	82,93%
<i>Comparables</i>	13,41%	0,10%	67,26%	19,23%
KKR	50,68%	2,23%	0,00%	47,09%
<i>Comparables</i>	21,58%	13,43%	31,57%	33,43%
Apollo	24,14%	4,11%	0,00%	71,75%
<i>Comparables</i>	51,10%	2,51%	13,49%	32,90%
Oaktree	88,93%	0,08%	0,04%	10,95%
<i>Comparables</i>	21,87%	29,34%	16,96%	31,83%
Carlyle	61,26%	0,00%	0,00%	38,74%
<i>Comparables</i>	40,86%	19,22%	30,94%	8,98%
Ares	11,77%	0,09%	0,00%	88,14%
<i>Comparables</i>	6,87%	19,22%	36,74%	37,17%
EQT	21,80%	44,95%	0,00%	33,25%
<i>Comparables</i>	43,60%	16,32%	9,26%	30,82%

Table 7 below shows the ownership structure for the LPE fund managers over time, from the quarter of IPO, one year after IPO, three years after IPO and today. We see that institutional investors tend to increase, and that public owners tend to decrease over time for many of the LPE fund managers in our sample. The increase in the share of institutional shareholders could be explained by the fact that it becomes an alternative investment vehicle because of improved liquidity and lower transaction costs for institutions.

Table D.1 and Table D.2 in Annex D shows the analysis of LPs investing in the LPE fund managers as shareholders. We find that large institutions tend to invest both as LPs and shareholders. These investments tend to be made through different business lines, e.g. the private equity business line invests as an LP and the asset management business line invests as a shareholder. However, these institutions only make up a small share of the total number of LPs invested in the funds. Furthermore, we cannot see that the LPs invests as shareholders with the same investment vehicle to adjust their exposure to limited partnerships. This implies that investors, with indicated limited access to limited partnerships, have a higher demand for LPE fund managers and are more frequent owners of the LPE fund managers.

Table 7**Ownership structure over time (%)**

The table below shows the ownership structure over time after the IPO for the LPE fund managers in percent. Since EQT only has one point of measurement, it will not be included in this table.

Firm	Institutions	Individuals/Insiders	Strategic Owners	Other public
Blackstone				
At IPO	17,06%	0,00%	0,01%	82,93%
1 year after IPO	77,29%	0,04%	0,02%	22,65%
3 years after IPO	56,89%	0,27%	0,00%	42,84%
Today	55,91%	0,07%	0,01%	44,00%
KKR				
At IPO	50,68%	2,23%	0,00%	47,09%
1 year after IPO	64,80%	2,10%	2,12%	30,99%
3 years after IPO	65,04%	2,14%	1,63%	31,19%
Today	76,38%	4,77%	0,00%	18,86%
Apollo				
At IPO	24,14%	4,11%	0,00%	71,75%
1 year after IPO	42,09%	1,64%	0,00%	56,28%
3 years after IPO	68,15%	3,30%	0,00%	28,55%
Today	71,41%	8,97%	1,40%	18,21%
Oaktree				
At IPO	88,93%	0,08%	0,04%	10,95%
1 year after IPO	75,44%	0,09%	0,04%	24,42%
3 years after IPO	73,47%	0,11%	0,03%	26,40%
Today	100,00%	0,00%	0,00%	0,00%
Carlyle				
At IPO	61,26%	0,00%	0,00%	38,74%
1 year after IPO	60,95%	0,36%	0,00%	38,69%
3 years after IPO	59,27%	0,78%	0,00%	39,95%
Today	46,90%	2,90%	0,00%	50,21%
Ares				
At IPO	11,77%	0,09%	0,00%	88,14%
1 year after IPO	12,21%	0,04%	0,00%	87,75%
3 years after IPO	15,06%	0,50%	0,00%	84,43%
Today	93,42%	0,71%	0,04%	5,83%

6.3 Fundraising and Fund Performance Evaluation

In this section we investigate hypothesis 3 covering fundraising and fund performance. The first sub-hypothesis is that fundraising should increase significantly after IPO, including (1) growth in AUM, (2) growth in management fees and (3) growth in fund sizes. The second sub-hypothesis is that fund performance should deteriorate significantly after IPO.

6.3.1 Methodology

6.3.1.1 *Growth in AUM and management fees*

To test hypothesis 3(a), we calculate growth in AUM from 2003, or later, to 2019 for our sample of LPE fund managers and compare it to the overall private equity market growth in AUM. Additionally, the growth in managements fees, as well as revenue structure is calculated for the period from 2004 or later, to 2019. The analysis of growth in AUM and management fees is performed qualitatively.

6.3.1.2 *OLS regressions testing performance and size of funds*

To test hypotheses 3(a) and 3(b), we run simple linear regressions using the ordinary least squares (OLS) method. The simple linear equation takes the following form:

$$y_i = \alpha + \beta * x_i + \varepsilon_i \quad (1)$$

where y_i is a dependent variable, x_i is an explanatory variable and ε_i is the residual or the error term. To describe the effect of the IPO on fund's performance and size, we run five regressions with the following variables:

Table 8**List of variables for OLS regressions**

The table below shows the list of dependent (y) and explanatory (x) variables for each of the five regressions, as well as the way they've been calculated.

	Dependent Variable	Explanatory Variable
1	Performance (MOIC) quartiles for funds in all four business lines	Dummy Variable. '1' represents the funds that started harvesting post-IPO, '0' - pre-IPO. As a general rule we assume that funds whose vintage year is no earlier than three years prior IPO are considered to be post-IPO, as the decisions of how to realize the investments are made after the firm goes public.
2	Performance (MOIC) quartiles for private equity funds	
3	Performance (MOIC) quartiles all the funds apart from private equity	
4	Deviation of the fund size from the average fund raised in the market in a corresponding year (in %)	Dummy Variable. '1' represents the funds that closed the fundraising post-IPO, '0' - pre-IPO. As a general rule we assume that funds whose vintage is no earlier than IPO year are considered to be post-IPO, as the decisions about the final fund size are made after the firm decides to go public.
5	Deviation of the fund size from the average fund raised by the private peer group in a corresponding year (in %)	

To calculate performance quartiles, we: (1) find the latest reported (as of 31.12.2018) multiple of invested capital (“MOIC”) in the annual reports or calculate the metric using the following formula:

$$MOIC = \frac{\text{Realized Value} + \text{Unrealized Value}}{\text{Total Amount Invested}} \quad (2)$$

and (2) use four Preqin benchmark datasets – for private equity, real estate, private debt and infrastructure – in order to determine the quartile that corresponds to the calculated MOIC. The Preqin Database (available through Wharton Research Data Services) provides 5 thresholds for multiples - Max, Q1, Median, Q3, Min - that represents the borders of four equal groups of funds (quartiles). Hence, the best performing funds appear in the first quartile and the worst performing funds appear in the fourth quartile.

To provide correct standard errors in cases when heteroscedasticity is present, we calculate robust (White) standard errors in all the regressions. The regression results would demonstrate whether there is an IPO effect on performance (regression 1 to 3) and size (regression 4 and 5) of the funds. If the beta is significant, the funds experience a positive or negative effect when a company goes public.

One limitation is the use of MOIC as a performance measure of the LPE fund managers’ funds, since MOIC only is a rough indicator of the return on the investment in terms of *how much*. The IRR on the other hand captures the return on investments in terms of both *how much* and

when. Since both measures have shortcomings, it would have been optimal to examine both. However, due to data availability, we have only been able to use the MOIC since quartiles for IRR were not available for all funds.

Another limitation is that the time period examined might be insufficient to pick up fundraising trends.

6.3.2 Data Description

For the analysis of this hypothesis, we have four datasets in total. The first dataset contains the AUM and fee generating AUM for the LPE fund managers from 2003, or later, until 2019. Moreover, it includes the AUM over time for the global private equity market (including all segments of the private equity market) retrieved from an investor report (Carlyle, 2020). Graphs of the AUM for the sample LPE fund managers can be found in Annex E. We have also calculated the AUM growth rate which can be seen in Table 9 below.

Table 9

Annual growth in total AUM

The table below shows the growth in assets under management ("AUM") for the seven LPE fund managers examined. We use the private equity market historical AUM as a benchmark, retrieved from Prequin. The PE firms initial public offering ("IPO") year is marked in grey.

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Blackstone	59%	36%	47%	-8%	4%	30%	30%	26%	26%	9%	16%	9%	18%	9%	21%
KKR	54%	58%	28%	-5%	16%	18%	-3%	39%	20%	7%	12%	8%	30%	16%	12%
Apollo	n.i.	n.i.	n.i.	8%	20%	27%	11%	0%	113%	-1%	7%	13%	30%	13%	18%
Oaktree	8%	19%	48%	-5%	47%	13%	-9%	3%	8%	9%	7%	3%	0%	n.i.	n.i.
Carlyle	50%	25%	80%	6%	5%	19%	37%	16%	11%	3%	-7%	14%	24%	11%	3%
Ares	14%	50%	50%	39%	36%	24%	17%	22%	23%	11%	15%	1%	12%	23%	14%
EQT	-6%	10%	74%	15%	7%	-4%	34%	6%	1%	0%	36%	70%	3%	52%	9%
Growth in PE market	28%	37%	35%	1%	8%	12%	11%	9%	15%	3%	8%	7%	16%	16%	17%

For 2019, data for June 2019 has been used

The second dataset includes the revenue structure of the LPE fund managers, that comprises management fee, performance fees and other revenue sources ("other"). The data is available up until 2019. The table demonstrating revenue structure for each company can be found in Annex F.

Table 10 below shows management fee growth throughout the years (management fees in absolute terms can be found in Annex G). The data for the first two datasets, including total AUM, fee-generating AUM and revenue structure, is retrieved from the LPE fund managers' IPO prospectus and annual SEC filings (form 10-K).

Table 10

Annual growth in management fees

The table below shows the growth in management fees for the seven LPE fund managers examined. The LPE fund managers' IPO year is marked in grey.

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Blackstone	-3%	125%	45%	-6%	0%	7%	14%	12%	8%	14%	3%	-4%	12%	10%	15%
KKR	n.i.	n.i.	n.i.	n.i.	3%	7%	24%	22%	81%	21%	-7%	208%	13%	3%	14%
Apollo	n.i.	n.i.	n.i.	99%	6%	6%	13%	19%	16%	26%	9%	12%	11%	16%	17%
Oaktree	n.i.	n.i.	n.i.	n.i.	17%	18%	-3%	3%	0%	2%	-1%	4%	-5%	-5%	-19%
Carlyle	n.i.	n.i.	n.i.	n.i.	-3%	-2%	19%	7%	1%	18%	-7%	-1%	-5%	24%	16%
Ares	n.i.	n.i.	n.i.	n.i.	n.i.	n.i.	n.i.	35%	50%	30%	30%	1%	13%	11%	22%
EQT	n.i.	n.i.	n.i.	n.i.	n.i.	n.i.	n.i.	n.i.	n.i.	n.i.	n.i.	n.i.	37%	19%	50%

The third dataset (Annex H) includes the performance details of 176 funds raised by 31.12.2018 (as Prequin quartile data is available only for 2018). Only funds that meet the required level of detail (reported committed capital, vintage year and performance metrics) are included. The funds raised by EQT are not included in the dataset since they only have pre-IPO funds reported and the purpose of the dataset is to use it in an OLS regression that shows the effect of the IPO on fund performance and size. Co-investments are also excluded from the dataset. The funds in the dataset are divided into four business lines: private equity, credit, real estate and infrastructure. Every fund has an information on vintage year, fund size (committed capital) and MOIC (reported or calculated by the authors). Fund details, including size and performance metrics (MOIC) are found in annual SEC filings (form 10-K). Table 11 below summarizes the data:

Table 11**Summary statistics of the funds in the dataset**

The table below demonstrates the summary statistics for 176 funds of the 6 LPE fund managers, including number of observations (N), size (in mil\$), and performance (MOIC). Data is stated as of 31.12.2018

	Blackstone	KKR	Apollo	Oaktree	Carlyle	Ares	Total
N							
Private Equity	14	22	7	9	23	5	80
Credit	7	7	10	16	3	2	45
Real estate	14	2	4	8	8	2	38
Infrastructure	0	2	0	1	8	2	13
Total	35	33	21	34	42	11	176
Size (mill \$)							
Mean	5 931	3 038	3 449	2 018	2 890	1 923	3 360
Min	381	196	104	253	453	747	104
Median	4 120	1 946	1 485	1 267	1 668	1 515	1 994
Max	21 022	17 642	18 377	10 940	13 720	4 700	21 022
StDev	5 344	3 445	4 884	2 061	2 961	1 272	3 907
MOIC							
Mean	1,76	2,24	1,49	1,51	1,80	1,53	1,76
Min	1,10	0,30	1,02	1,10	0,20	0,90	0,20
Med	1,60	1,50	1,37	1,45	1,55	1,40	1,50
Max	2,80	13,50	2,73	2,10	4,00	2,50	13,50
StDev	0,51	2,33	0,43	0,31	0,71	0,45	1,13

The fourth dataset contains the market benchmark data for private equity funds that is used for the OLS regression. This includes the average fund size in the given year (calculated by dividing aggregate capital raised globally in a year by the number of funds closed), as well as average fund size for the group of private peers in respective vintage year. The latter is calculated from the size data on 178 funds (co-investments not included) raised by six comparable private competitors: Ardian, Warburg Pincus, TPG, CVC Capital Partners, Advent International and Bain Capital. The benchmark data for each vintage year is shown in Annex I. The data source for global private equity fundraising (1996-2017) is Preqin Global PE & VC Report (2018) and for private peers' fund sizes we use the Preqin Database available through Wharton Research Data Services.

6.3.3 Result

6.3.3.1 Growth in AUM and management fees

In Table 12 below, we compare the growth in AUM between the LPE fund managers in our sample and the private equity market growth. We can see that almost all of the LPE fund managers, except Ares, have a lower growth in AUM in the years after the IPO compared to the market. Moreover, in several cases the growth in AUM is higher than the private equity market in the IPO year and the years before the IPO. This could indicate that the LPE fund managers want to time the IPO when the growth in AUM is high. However, since the growth rates are volatile, it is hard to draw any conclusions regarding growing the AUM to window-dress the company for the IPO.

Table 12

Annual growth in total AUM

The table below shows the growth in assets under management ("AUM") for the seven PE fund managers. We use the private equity market historical AUM, including all segments of the private equity market, as a benchmark. We also show the average growth in AUM at each time period as well as the average difference against the private equity market.

	4 years prior IPO	3 years prior IPO	2 years prior IPO	1 year prior IPO	Year of IPO	1 year post IPO	2 year post IPO	3 year post IPO	4 year post IPO
Blackstone	n.i.	n.i.	59%	36%	47%	-8%	4%	30%	30%
<i>Diff PE market</i>	<i>n.i.</i>	<i>n.i.</i>	<i>31%</i>	<i>-1%</i>	<i>13%</i>	<i>-9%</i>	<i>-4%</i>	<i>19%</i>	<i>19%</i>
KKR	58%	28%	-5%	16%	18%	-3%	39%	20%	7%
<i>Diff PE market</i>	<i>21%</i>	<i>-7%</i>	<i>-6%</i>	<i>8%</i>	<i>6%</i>	<i>-13%</i>	<i>30%</i>	<i>5%</i>	<i>4%</i>
Apollo	n.i.	8%	20%	27%	11%	0%	113%	-1%	7%
<i>Diff PE market</i>	<i>n.i.</i>	<i>7%</i>	<i>12%</i>	<i>16%</i>	<i>1%</i>	<i>-9%</i>	<i>98%</i>	<i>-4%</i>	<i>-1%</i>
Oaktree	-5%	47%	13%	-9%	3%	8%	9%	7%	3%
<i>Diff PE market</i>	<i>-6%</i>	<i>39%</i>	<i>1%</i>	<i>-20%</i>	<i>-6%</i>	<i>-7%</i>	<i>5%</i>	<i>-1%</i>	<i>-4%</i>
Carlyle	6%	5%	19%	37%	16%	11%	3%	-7%	-14%
<i>Diff PE market</i>	<i>5%</i>	<i>-4%</i>	<i>7%</i>	<i>27%</i>	<i>7%</i>	<i>-4%</i>	<i>0%</i>	<i>-15%</i>	<i>-21%</i>
Ares	24%	17%	22%	23%	11%	15%	1%	12%	23%
<i>Diff PE market</i>	<i>12%</i>	<i>6%</i>	<i>14%</i>	<i>8%</i>	<i>8%</i>	<i>7%</i>	<i>-6%</i>	<i>-5%</i>	<i>7%</i>
EQT	36%	70%	3%	52%	9%	n.i.	n.i.	n.i.	n.i.
<i>Diff PE market</i>	<i>28%</i>	<i>63%</i>	<i>-14%</i>	<i>36%</i>	<i>-9%</i>	<i>n.i.</i>	<i>n.i.</i>	<i>n.i.</i>	<i>n.i.</i>
Average	24%	29%	19%	26%	16%	4%	28%	10%	9%
<i>Average diff PE market</i>	<i>12%</i>	<i>17%</i>	<i>6%</i>	<i>11%</i>	<i>3%</i>	<i>-6%</i>	<i>20%</i>	<i>0%</i>	<i>1%</i>

Table 13 below shows management fee growth relative to the year of the IPO (management fees throughout the years in absolute terms can be found in Annex G). As market data is not available to assess whether there are any significant differences compared to the other fund managers, the growth rate alone is not enough to draw any conclusions about the effect of the IPO on fundraising (hypothesis 3(a)). However, it is interesting to note, that, similarly to AUM, on average the firms were growing the management fees aggressively prior to the IPO (particularly driven by Blackstone and Ares), while slowing down the growth pace post-IPO. That can be a sign of the LPE fund managers' deliberate efforts to grow management fees prior to the IPO in order to meet the concerns of potential shareholders.

Table 13

Annual growth in management fees

The table below shows the growth in management fees for the seven LPE fund managers.

	3 years prior IPO	2 years prior IPO	1 year prior IPO	Year of IPO	1 year post IPO	2 years post IPO	3 years post IPO
Blackstone	n.i.	-3%	125%	45%	-6%	0%	7%
KKR	n.i.	n.i.	3%	7%	24%	22%	81%
Apollo	99%	6%	6%	13%	19%	16%	26%
Oaktree	17%	18%	-3%	3%	0%	2%	-1%
Carlyle	-3%	-2%	19%	7%	1%	18%	-7%
Ares	n.i.	35%	50%	30%	30%	1%	13%
EQT	n.i.	37%	19%	50%	n.i.	n.i.	n.i.
Average	38%	15%	31%	22%	11%	10%	20%

Furthermore, if we look at the full revenue structure for each company (Annex F), we can see that the management fees represent a more stable revenue source, that grows year by year in absolute terms, compared to performance fees that are relatively volatile over the years. That supports the idea that the shareholders' value management fees more, because of its recurring and predictable nature (Fernyhough & Klees, 2019). Still, today, for some firms (Blackstone, KKR and Carlyle) the management fees represent less than 50% of the revenues. A steadily growing proportion of other revenue streams (primarily investment income) can be the reason behind that.

6.3.3.2 Fund Size and Performance

From the initial view at Table 14, that compares the average fund performance prior to the IPO versus average fund performance since inception up until 2018 (hence, pre-IPO funds included), one can notice that for four out of six firms (Blackstone, KKR, Apollo and Ares) the average MOIC is decreasing when accounting for post IPO funds, implying that the average fund performance is getting worse. This could also be seen in terms of quartiles, since the number of funds in the 1st and 2nd quartile is decreasing relative to the ones in the 3rd and 4th quartile. This means that after the IPO, the performance is deteriorating relative to other funds in the market. However, the differences are not statistically significant, hence we turn to OLS regressions to explore how the fund performance, as well as fund sizes, change after the IPO.

Table 14
Managed funds' average performance summary

The table below describes the funds' average performance reported: (1) at the IPO year (only the funds that reported its performance in the IPO prospectus are included), (2) in the end of 2018 (including funds raised pre-IPO). Fund size figures are in \$ billion. Note that the first quartile is implying better performance than the fourth quartile.

	Blackstone		KKR		Apollo		Oaktree		Carlyle		Ares		All	
	Pre-IPO	Total	Pre-IPO	Total	Pre-IPO	Total	Pre-IPO	Total	Pre-IPO	Total	Pre-IPO	Total	Pre-IPO	Total
MOIC														
Private Equity	2,2	1,8	3,2	2,7	1,8	1,6	1,3	1,6	1,9	2,1	1,9	1,8	2,2	2,1
Credit		1,3		1,2		1,5	1,3	1,4	1,4	1,5		1,4	1,3	1,4
Real estate	2,1	2,0		1,4		1,3	1,2	1,6	1,2	1,6		1,4	1,5	1,7
Infrastructure				1,5				1,1	1,3	1,4		1,2	1,3	1,3
Average	2,1	1,8	3,2	2,2	1,8	1,5	1,3	1,5	1,6	1,8	1,9	1,5	1,9	1,8
% number of funds														
1st quartile	50	49	57	42	80	38	50	26	64	45	67	27	59	40
2nd quartile	40	40	29	21		10	17	38	8	14	33	45	19	27
3rd quartile	10	9	7	12	20	33	28	18	16	26			16	18
4th quartile	0	3	7	24		19	6	18	12	14		27	7	16
% size of funds														
1st quartile	51	61	27	46	96	42	56	40	75	42	88	40	60	49
2nd quartile	39	32	60	35		15	18	31	11	14	12	41	26	27
3rd quartile	10	5	3	8	4	34	23	13	10	32			9	16
4th quartile	0	1	10	11		10	4	16	5	12		19	5	8
Number of funds	10	35	14	33	5	21	18	34	25	42	3	11	75	176
Total size of funds	21	208	59	100	34	72	44	69	69	121	6	21	233	591
Average fund size	2,1	5,9	4,2	3,0	6,7	3,4	2,4	2,0	2,8	2,9	2,1	1,9	3,1	3,4
Average PE fund size	3,0	7,1	4,2	3,8	6,7	7,5	2,0	1,9	3,3	3,3	2,1	2,5	3,6	4,2

In order to assess the IPO effect on size and performance of the funds, five OLS regressions have been performed (the summary can be found below in Table 15). The variables are described in Section 6.3.1.2. The results for the first regression show that pre-IPO, the funds' performance (all business lines) was in the second quartile, while it got worse by half of a quartile (significant at a 1% significance level) post-IPO, which supports hypothesis 3(b). Yet it is interesting to mention that looking only at private equity funds, the IPO effect becomes more severe (performance gets worse by 0,7 quartile) at a 5% significance level, while there is no significant effect on the performance of funds in other business lines. That means that the IPO has the strongest effect on the core (private equity) funds, rather than other business lines, that in general perform worse even pre-IPO ($\alpha=2,044$). However, it should be taken into consideration that the sample of pre-IPO non-private equity funds is relatively small (23 funds).

Table 15

Regressions summary

The table below shows the results of five OLS regressions. The variables are described in Section 6.3.1.2. The intercept represents the average quartile/deviation in size from the benchmark pre-IPO. If the beta is significant, the funds experience a positive or negative performance/size effect when a company goes public. Private peers are Ardian, Warburg Pincus, TPG, CVC Capital Partners, Advent International and Bain Capital. N - number of observations. The data is as of 31.12.2018. The full list of funds used in regressions can be found in Annex H.

	Performance			Size	
	All funds	PE funds	Other funds	PE funds vs PE market	PE funds vs private peers
Intercept (α)	1,746	1,575	2,044	13,953	3,780
Robust Std. Error	0,123	0,136	0,226	2,269	1,182
t-Statistic	14,209	11,546	9,052	6,148	3,197
p-Value	0,000	0,000	0,000	0,000	0,002
Beta (Post-IPO effect)	0,546	0,700	0,258	1,576	-2,698
Robust Std. Error	0,161	0,229	0,259	4,037	1,308
t-Statistic	3,385	3,060	0,997	0,390	-2,062
p-Value	0,001	0,003	0,322	0,698	0,043
N	176	80	96	71	77

The fourth regression, that compares fund sizes of the LPE fund managers (only private equity business line) to market averages, demonstrates no significant results. The coefficients show that there is a positive effect of the IPO on fund size, but the obtained data is not enough to reject

the null hypothesis. Hence, if we use the market average as a benchmark, the data cannot support hypothesis 3(a).

The last regression, that compares private equity fund sizes to the group of private peers, shows that fundraising becomes less aggressive after the IPO (significant at 5%), even though the fund sizes are still bigger than the ones raised by the largest private fund managers. Therefore, hypothesis 3(a) is not supported by the results of the regression analysis.

Overall, we argue that fund performance deteriorates significantly after the IPO. However, we cannot find any significant results proving that fundraising increases significantly after the IPO, regardless of whether we assess it through growth in AUM, management fees or fund size. On a contrary, we notice two things; (1) in some cases the AUM and management fees grows faster prior to the IPO; (2) comparing to the group of private peers, the sample firms demonstrate more aggressive fundraising before the IPO, not after.

6.4 Underpricing and Trading Volumes

In this section we investigate hypothesis 4 that the majority of LPE fund managers should experience underpricing.

6.4.1 Methodology

To assess underpricing, we calculate the initial returns (first day returns), that are computed as the percentage return from the offering price to the first closing price (Ritter, 2020):

$$Initial\ Return = \frac{Closing\ Price - Offer\ Price}{Offer\ Price} \quad (3)$$

To provide a basic understanding of the magnitude of first day trading and stock liquidity, we calculate the IPO (first day) turnover ratio that is defined by Ritter (2020) as the maximum of the first three days' trading volume divided by the number of shares issued (not including the overallotment option). The highest of these first three days is almost always the first day.

$$IPO\ Turnover\ Ratio = \frac{First\ Day\ Trading\ Volume}{Number\ of\ shares\ offered\ in\ the\ IPO} \quad (4)$$

The results are thereafter analyzed qualitatively. One limitation is that the sample is small which makes it unreasonable to perform any statistical tests. Thus, the analysis can be extended once more data is available on the IPOs of LPE fund managers.

6.4.2 Data Description

The data contains closing share prices and trading volumes of the sample companies, as well as index values of S&P 500 and OMX, retrieved from the database Capital IQ. The benchmark data (for all firms except EQT) on market initial returns and turnover is found on the website of Warrington College of Business (Ritter, 2020). The benchmarks for EQT's initial return and IPO turnover are calculated using an IPO information on all 22 companies that went public on Nasdaq Stockholm in 2019. The full list of the companies is presented in Annex J.

6.4.3 Result

Out of seven LPE fund managers researched, only two demonstrated signs of underpricing: Blackstone and EQT. Blackstone's initial return was in line with the US market average (13% vs 14%), while EQT's initial return was substantially higher than the average for Nasdaq Stockholm in 2019 (34% vs 13,7%). The rest of the LPE fund managers traded close to their offer prices, or even showed signs of overpricing at the IPO days.

Table 16

Level of underpricing and trading volumes

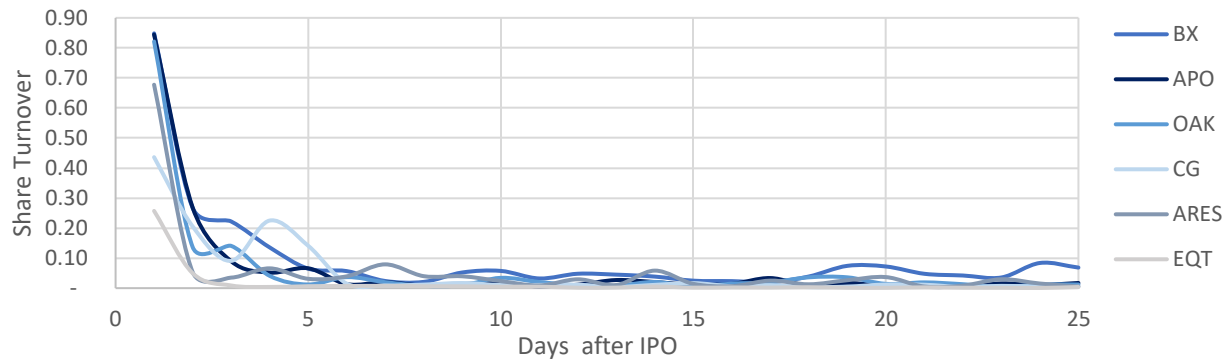
The table below shows the summary of underpricing and liquidity analysis for selected LPE fund managers. We chose S&P 500 as a control index for all the firms except for EQT that was compared to OMX. The benchmark data (for all firms but EQT) on market initial returns and turnover was found on the website of Jay R. Ritter, University of Florida. The benchmarks for EQT initial return and IPO turnover were calculated as an equally weighted averages for the firms that got listed on Nasdaq Stockholm in 2019. US market average return and mean IPO turnover are mentioned for the given year. All prices are in USD, except for EQT (SEK).

	IPO Year	Initial Price Range	Offering Price	Closing price first day	Initial Return	Index change the same day	Market average initial return	IPO Turnover Ratio	Mean IPO Turnover for the stock exchange	Daily Share Turnover 25 days after IPO
Blackstone	2007	29-31	31	35,06	13%	-1,3%	14,0%	0,85	0,64	0,07
KKR*	2010	n.a.	10,5	10,20	-3%	0,2%	9,2%	n.a.	0,59	n.a.
Apollo	2011	17-19	19	18,20	-4%	0,5%	13,8%	0,84	0,86	0,02
Oaktree	2012	43-46	43	42,39	-1%	1,4%	17,2%	0,82	0,87	0,01
Carlyle	2012	23-25	22	22,05	0%	-0,8%	17,2%	0,44	0,72	0,01
Ares	2014	21-23	19	18,60	-2%	-0,2%	15,0%	0,68	0,79	0,01
EQT	2019	62-68	67	90,00	34%	-0,3%	13,7%	0,26	0,30	0,00

* KKR listed on the New York Stock Exchange in July 2010 but did not raise capital at the time. Before this IPO, KKR was previously listed on Euronext Amsterdam, from which it was delisted at the time of the NYSE listing.

Regarding the stock liquidity at the IPO date, we can see that only Blackstone was trading at a higher than an average turnover at the corresponding stock exchange in the same (IPO) year. The other LPE fund managers had a turnover ratio below or at average levels. Looking at the longer-term liquidity, similarly we can observe that in 25 days after the IPO the daily trading volumes relative to the shares offered at the IPO were higher for Blackstone than for other fund managers. Low liquidity for EQT can be explained by in general lower share turnover on the Swedish Stock Exchange in comparison with the US.

Figure 6
Share turnover in the first 25 trading days



Overall, the sample confirms our assumption about the relationship between underpricing and stock liquidity. However, with only two companies demonstrating underpricing, the data does not support hypothesis 4. One potential explanation why the other LPE fund managers showed no underpricing can lie in the fact that for some of them (Apollo and Oaktree), the pre-IPO owners were selling part of the existing shares in the IPO. Therefore, they were not interested in leaving money on the table and wanted to maximize the market value of their wealth. However, for EQT, a lot of existing shares were sold in the IPO which would not support this argument. This can be partly explained by the fact that EQT, as stated in their prospectus, wanted to broaden the ownership base and may thus choose to underprice at the IPO.

The other way to look at the IPO performance can be decreasing investor excitement about LPE fund managers going public over the years. For example, Blackstone went public during a market peak, right before the global financial crisis. However, when Oaktree went public, Blackstone was roughly 50% below the IPO price and Apollo -20%. Public market investors have been struggling to value the balance sheets of these firms and the fee revenues are often too cyclical and volatile. As Leon Black, co-founder of Apollo, explained: “The public market doesn’t understand creatures like us very well” (Milne, 2014). By the time Carlyle went public, Blackstone’s and Apollo’s shares had dropped 56% and 32% respectively since their IPOs, and Oaktree, that was viewed by some investors as a litmus test for Carlyle’s IPO by going public one month before, had fallen 6%. This could affect investors’ enthusiasm and may be one of the reasons of a low IPO turnover. Ares’s IPO came amid stock market volatility that had led many IPOs to price below their expected ranges. Only EQT seemed to break the vicious circle with its

successful IPO, picking the right time and going public during a bull market when all the previously LPE fund managers were trading above their IPO prices.

Another interesting pattern in our sample is that companies whose offer price was below file price range (Carlyle and Ares) demonstrated much lower IPO turnover relative to the market benchmark. The numbers look better for the firms with the offer price at the bottom/middle of the price range (Oaktree and EQT). Those companies pricing their IPOs at the top of their price range (Blackstone and Apollo) achieved the best turnover.

Touching upon the topic of trading volumes, it is important to note that the liquidity also was affected by the business structures of the LPE fund managers. Previously, a relatively small set of shareholders was willing to participate in trading the LPE fund managers' stocks because of the limitations and complications connected with the partnership structure. Since the implementation of US tax reforms in 2018, five of the sample LPE fund managers have converted to C-Corp, demonstrating a clear trend of increasing trading volumes (the average daily volumes pre- and post-conversion can be found in Annex K).

6.5 Risk and Return Analysis

In this section we analyze the stock performance of the seven LPE fund managers, as well as investigate hypothesis 5 that the LPE fund managers should have a higher beta than LPs.

6.5.1 Methodology

To analyze the stock performance of selected LPE fund managers, we look at several metrics including Sharpe ratio, Treynor ratio and Jensen's alpha. To test hypothesis 5, we calculate market betas for LPs and GPs using the Capital Asset Pricing Model ("CAPM") and the Fama-French Five Factor Model ("FF5"), and then compare two samples' average betas using Welch's t-test. To provide unbiased standard errors estimates when heteroscedasticity is present, we calculate robust (White) standard errors in all the regressions.

6.5.1.1 Sharpe ratio

Sharpe (1966) constructed a measurement of the performance of a portfolio, called Sharpe ratio, which takes into account the trade-off between the return and the risk. The formula for Sharpe ratio is the following:

$$\text{Sharpe ratio} = \frac{(r_i - r_f)}{\sigma_i} \quad (5)$$

where r_i is the return of the investment i , r_f is the risk free rate and σ_i is the standard deviation of investment i 's returns. The measurement calculates risk-adjusted return, and one could generally say that the higher Sharpe ratio, the more preferable the investment is in terms of risk-adjusted returns. This means that a negative Sharpe ratio or a Sharpe ratio equal to zero implies that an investment should not be made.

6.5.1.2 Treynor ratio

The Treynor ratio was introduced by Treynor (1965) as an alternative of the reward-to-variability ratio, where the volatility (measured by the beta-coefficient) is used instead of variability. The ratio measures a portfolio's return by taking into account the systematic risk.

$$Trey\text{nor ratio} = \frac{(r_i - r_f)}{\beta_i} \quad (6)$$

where r_i is the return of the investment i , r_f is the risk free rate and β_i is the beta-coefficient of investment i 's returns. An investor will invest in a portfolio with high Treynor ratio since this means that the unsystematic risk is diversified away. A consequence of the measure is that the ratio cannot be calculated for investments with negative beta-coefficients.

6.5.1.3 The capital asset pricing model

For the quantitative analysis of the performance of LPE fund managers, we use the CAPM. The CAPM is a very commonly used model for evaluating the performance of an asset. It measures risk and explains the relationship between risk and return (Berk & DeMarzo, 2014). The model is presented below:

$$r_t - r_{ft} = r_{ft} + \beta^{rm} * (r_{mt} - r_{ft}) + u_t \quad (7)$$

where $r_t - r_{ft}$ is the return subtracted with the risk free rate, r_{ft} is the risk free rate and β^{rm} is the sensitivity to market fluctuations, $r_{mt} - r_{ft}$ is the market premium and u_t is the error term.

Important to note is that the CAPM has been criticized since the model is not good in explaining observed returns. Fama and French (2004) writes that there are empirical problems with the CAPM. Using Jensen's alpha, defined in Section 6.5.1.5, may result in problems when studying small-cap stocks are value stocks, since these securities tend to produce positive abnormal returns compared to the prediction of the CAPM even if the fund managers have no superior skills. Therefore, Fama and French created a three-factor model, where a size factor and a value factor adjusts downwards for observed small-cap and value stock out-performance. Despite the criticism, we still use the CAPM since it is often used in literature. However, we also run the results with the Fama-French Five Factor Model, explained in Section 6.5.1.4.

6.5.1.4 Fama-French Five Factor Model

Fama and French (2014) extended their three-factor model and created five factor model, directed at capturing size, value, profitability and investment patterns in average stock returns.

$$R_{it} - R_{Ft} = a_i + b_i(R_{Mt} - R_{Ft}) + s_iSMB_t + h_iHML_t + r_iRMW_t + c_iCMA_t + e_{it} \quad (8)$$

where, R_{it} is the return on security or portfolio i for period t , R_{Ft} is the risk-free return, R_{Mt} is the return on the value-weight market portfolio, SMB_t is the return on a diversified portfolio of small stocks minus the return on a diversified portfolio of big stocks, HML_t is the difference between the returns on diversified portfolios and low B/M stocks, RMW_t is the difference between the returns on diversified portfolios of stocks with robust and weak profitability, CMA_t is the difference between the returns on diversified portfolios of stocks of low and high investment firms (conservative and aggressive), and e_{it} is a zero-mean residual. If the exposures to the five factors, b_i, s_i, h_i, r_i , and c_i , capture all variation in expected return, the intercept a_i is zero for all securities and portfolios i .

6.5.1.5 Jensen's alpha

Jensen (1968) writes that understanding and measuring risk is difficult when attempting to evaluate portfolio performance. Moreover, one needs to allow for the possibility that the manager has superior forecasting skills when estimating the systematic risk of the portfolio. This implies that the portfolio would earn more than the regular risk premium given its level of risk, measured by a constant called “alpha” in the CAPM (as well as FF5) regression. Jensen's alpha measures the difference between the actual average return and the expected return given market conditions and the risk of the portfolio. The alpha coefficient could be seen as a measure of abnormal performance.

6.5.1.6 Welch's t-test

To compare two samples' mean we use Welch's t-test, introduced by Welch (1947). The test represents an alternative to Student t-test and is used when the number of observations in each sample is different, and the variances of the two populations are unequal. The formulas for calculating the t-value and degrees of freedom are presented below:

$$t = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\frac{\sigma_1^2}{N_1} + \frac{\sigma_2^2}{N_2}}} \quad (9)$$

$$df = \frac{\left(\frac{\sigma_1^2}{N_1} + \frac{\sigma_2^2}{N_2}\right)^2}{\frac{\sigma_1^4}{N_1^2(N_1-1)} + \frac{\sigma_2^4}{N_2^2(N_2-1)}} \quad (10)$$

where \bar{X}_i is the mean of the sample i , σ_i^2 is its variance, and N_i is the number of observations in each sample. Using the values for degrees of freedom and level of significance (we choose 5%), we find a critical two-tail value from the t-value distribution table and compare it with the calculated t-value. If the latter is bigger (in absolute terms) we reject the null hypothesis that the two populations means are equal at a significance level of 5%.

6.5.2 Data Description

The first dataset includes dividend adjusted share prices of the sample companies, as well as index values of the S&P 500, retrieved from the database Capital IQ. EQT is excluded because of their short trading history. The adjusted price is chosen over the closing price because it is considered to be a better reflection of the stock's true value after accounting for dividends, providing an accurate representation of a company's equity value. The data is available from the IPO date up until 31.03.2020. The graphs demonstrating the numbers for each company can be found in Annex L and the correlations between the stocks in Annex M. The summary statistics are shown below:

Table 17

Summary statistics for daily dividend adjusted returns

The table shows the summary statistics for daily dividend adjusted returns of six LPE fund managers. StDev - standard deviation, N - number of observations. The data stated as of 31.03.2020.

	Mean	Min	Med	Max	StDev	N
Blackstone	0,08%	-31,42%	0,06%	38,28%	2,97%	3 215
KKR	0,08%	-13,86%	0,08%	18,05%	2,10%	2 444
Apollo	0,09%	-15,90%	0,09%	26,24%	2,19%	2 265
Oaktree	0,04%	-7,43%	0,00%	12,34%	1,26%	1 877
Carlyle	0,05%	-21,20%	0,06%	16,98%	2,07%	1 989
Ares	0,08%	-13,37%	0,00%	18,41%	2,14%	1 488

The second dataset consists of dividend adjusted share prices of twelve publicly traded fund-of-funds that play the role of a proxy of LPs in the thesis (retrieved from Capital IQ). The majority of the selected firms have been LPs to one or more of the seven listed PE fund managers. Only funds with sufficient trading history and non-zero trading volumes are included. The data is available from the IPO dates up until 31.03.2020. The list of companies is shown below:

Table 18
Listed fund-of-funds

The table lists publicly traded fund-of-funds that plays the role as a proxy of limited partners.			
Firm	Ticker	Firm	Ticker
NB Private Equity Partners Limited	LSE:NBPE	Intermediate Capital Group plc	LSE:ICP
Pantheon International PLC	LSE:PIN	Princess Private Equity Holding Limited	LSE:PEY),
Partners Group Holding AG	SWX:PGHN	Spice Private Equity AG	SWX:SPCE
Hamilton Lane Incorporated	NasdaqGS:HLNE	DeA Capital S.p.A.	BIT:DEA
JPEL Private Equity Limited	LSE:JPEL	HarbourVest Global Private Equity Ltd.	LSE:HVPE
BMO Private Equity Trust Plc	LSE:BPET	Brederode SA	ENXTBR:BREB

Market returns, risk-free rate of returns, and daily Fama-French five factors, used in the regressions, are downloaded from Kenneth R. French Data Library.

6.5.3 Result

Even though the stocks of LPE fund managers underperformed in the past (historical stock performance can be found in Annex N), the last few years of the bull market were successful for the LPE fund managers, especially after many of them transitioned to the C-Corp structure. If we look at the risk-return analysis presented below, the firms' metrics demonstrate better results compared to the S&P 500.

Table 19**Risk-return analysis of the selected LPE fund managers**

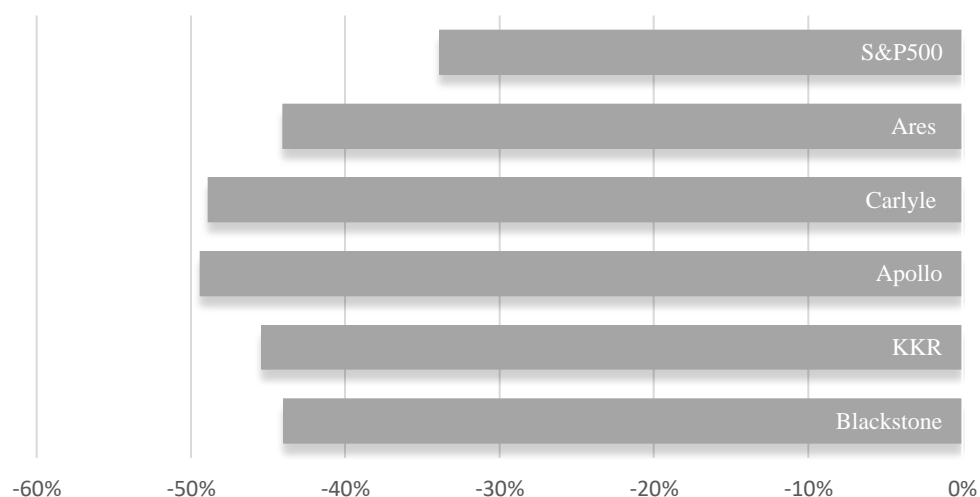
The table below shows the summary of risk-return statistics for six securities (EQT is excluded since a short trading record) and S&P 500 index, which was chosen as a control variable. The researched time period: 22.06.2007 - 31.03.2020

Parameter	Blackstone	KKR	Apollo	Oaktree*	Carlyle	Ares	S&P500
Annualized Return	9%	15%	17%	9%	7%	15%	4%
Annualized Std Dev	47%	33%	35%	20%	33%	34%	21%
Cumulative Return	183%	279%	308%	94%	69%	127%	72%
Annualized S ratio	0,16	0,42	0,47	0,43	0,19	0,41	0,17
Treynor ratio	0,05	0,11	0,14	0,16	0,05	0,14	0,04

* Oaktree was acquired by Brookfield Asset Management Inc. in 2019, thus stock's data is available only up until 27.09.2019

The results above include the sell-off caused by the spread of COVID-19. Figure 7 below illustrates the maximum drawdowns at the sell-off. The LPE fund managers in our sample simultaneously dropped more than 40% in a short period of time. Thus, all the results (except for standard deviation) are higher if we look at the pre-COVID-19 period (Annex O). Moreover, the market plunge affected other metrics calculated in this thesis, including correlations and betas, that have also increased after the sell-off.

Figure 7
COVID-19 maximum drawdowns



To assess excess returns and systematic market risk, CAPM and FF5 regressions are performed for each firm. EQT is excluded from this analysis because of its short trading history. The results are demonstrated in Table 20 below:

Table 20

CAPM and FF5 results

The table below demonstrates the results of CAMP and FF5 regressions for each LPE fund manager. The researched time period: 22.06.2007 - 31.03.2020. Robust (White) standard errors are mentioned in brackets.

	Blackstone	KKR	Apollo	Oaktree	Carlyle	Ares
CAPM						
Alpha (α)	0,0003 (0,0004)	0,0001 (0,0003)	0,0004 (0,0004)	0,0001 (0,0003)	0,0000 (0,0004)	0,0004 (0,0005)
Rm - Rf	1,4282 (0,0687) ***	1,3387 (0,0470) ***	1,1656 (0,0584) ***	0,5530 (0,0378) ***	1,1599 (0,0672) ***	0,9924 (0,0748) ***
Adj. R²	0,40	0,47	0,34	0,13	0,34	0,26
FF5						
Alpha (α)	0,0005 (0,0004)	0,0003 (0,0003)	0,0005 (0,0004)	0,0002 (0,0003)	0,0001 (0,0004)	0,0006 (0,0005)
Rm - Rf	1,2626 (0,0704) ***	1,2161 (0,0501) ***	1,1189 (0,0616) ***	0,5434 (0,0407) ***	1,0772 (0,0701) ***	0,9775 (0,0775) ***
SMB	0,0059 (0,1347)	0,1857 (0,0665) **	0,0022 (0,0921)	0,0937 (0,0599)	0,2173 (0,1450)	0,1513 (0,1297)
HML	0,4438 (0,1821) *	0,4943 (0,0829) ***	0,4194 (0,1516) **	0,0641 (0,0657)	0,4221 (0,1267) ***	0,2000 (0,1300)
RMW	-0,6794 (0,1678) ***	-0,3915 (0,1140) ***	-0,1252 (0,1394)	-0,0950 (0,0883)	-0,3968 (0,1331) **	-0,1154 (0,1512)
CMA	-0,4028 (0,3133)	-0,5187 (0,1444) ***	-0,1308 (0,1872)	0,0708 (0,1111)	-0,3401 (0,2251)	0,1397 (0,2175)
Adj. R²	0,42	0,49	0,35	0,14	0,35	0,27

Significance codes: 0 '***' 0.001 '**' 0.01 '*' 0.05

The alphas are insignificant in all the regressions; therefore, we fail to reject the null hypothesis that alpha is zero. This result is expected as the markets seem to operate with high degree of efficiency. All the market betas, on the other hand, are significant at a 0,1% significance level in both the CAPM and the FF5 regression. Oaktree has the lowest beta relatively to the other fund managers in the sample. There are two potential explanations: (1) Oaktree's distress strategy, which is less procyclical, may be reflected in the results and (2) since Oaktree was acquired by

Brookfield Asset Management Inc. in 2019, and stock's data available only up until 27.09.2019, the results do not include the period of the highest volatility (COVID-19 market plunge).

When comparing CAPM and FF5 results, the adjusted R^2 stays relatively the same. Hence, the additional four factors do not add substantial explanatory power, despite significant results for some of the factors. In other words, the returns of the selected companies co-move with the market rather than the other four factors. Therefore, we focus only on market betas, since it has the highest explanatory power.

To compare the market exposure of GPs and LPs, we calculated market betas for twelve LPs and compared the results to the sample's (LPE fund managers, GP's) betas. The results are shown in Table 21 below.

As expected, the results demonstrate much higher betas for the sample LPE fund managers compared to the group of LPs using both CAPM and FF5 regressions. To ensure that the difference is significant, a t-test was performed (results can be found in Annex P). As explained above, the FF5 does not substantially contribute to the analysis, hence, the t-test was performed only on CAPM results. With the t-value equal to -5.16, we reject the null hypothesis that the means of two populations are equal. Therefore, the difference is significant on a significance level of 5% and the results support hypothesis 5.

Table 21

Beta comparison between limited partners and general partners

The table below demonstrates the betas extracted from CAPM and FF5 regressions for selected LPs and GPs. Publicly traded fund-of-funds play the role of a proxy for LPs. The data is used starting from IPO up until 31.03.2020. Robust (White) standard errors are mentioned in brackets. The average beta is equally weighted.

LP name	CAPM: Rm - Rf	FF5: Rm - Rf	GP name	CAPM: Rm - Rf	FF5: Rm - Rf
PIN	0,1726 (0,0421) ***	0,1918 (0,0493) ***	Blackstone	1,4282 (0,0687) ***	1,2626 (0,0704) ***
HVPE	0,0976 (0,0889)	0,0667 (0,1056)	KKR	1,3387 (0,0470) ***	1,2161 (0,0501) ***
ICP	0,5061 (0,0457) ***	0,4894 (0,0470) ***	Apollo	1,1656 (0,0584) ***	1,1189 (0,0616) ***
PEY	0,1449 (0,0395) ***	0,1870 (0,0442) ***	Oaktree	0,5530 (0,0378) ***	0,5434 (0,0407) ***
PGHN	0,4831 (0,0396) ***	0,4793 (0,0479) ***	Carlyle	1,1599 (0,0672) ***	1,0772 (0,0701) ***
SPCE	0,0665 (0,0570)	0,0911 (0,0627)	Ares	0,9924 (0,0748) ***	0,9775 (0,0775) ***
BRET	0,1124 (0,0265) ***	0,1233 (0,0290) ***			
DEA	0,5036 (0,0323) ***	0,4203 (0,0353) ***			
HLNE	1,0999 (0,0972) ***	1,0152 (0,0823) ***			
BREB	0,2983 (0,0289) ***	0,2999 (0,0323) ***			
NBPE	0,2288 (0,0537) ***	0,2350 (0,0579) ***			
JPEL	0,0378 (0,0176) *	0,0492 (0,0183) **			
Average	0,3126	0,3040	Average	1,1063	1,0326

Significance codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

7 Discussion

7.1 Analysis and Discussion of the Results

This thesis has investigated the characteristics of seven LPE fund managers, using both a qualitative and quantitative approach. First, we looked at the stated reasons behind going public. In line with our first hypothesis and thus previous research (Kumpf, 2013; Gogineni & Megginson, 2010; Hudson, 2019), we found that the most common reasons for doing an IPO include: funding growth initiatives, expanding employee incentives, realizing value of the equity held by existing owners, as well as general corporate purposes, with funding growth initiatives and employee incentives being the most common. The result implies that the reasons for going public, as communicated by the LPE fund managers, mainly are aimed to be value-creating through building a balance sheet to expand and fund growth and improve employee incentives. However, the result also indicates that the decision to go public is based on value-extracting motives, i.e. a way for existing owners to get liquidity. This brings up to discussion whether there is a difference in the motives communicated by the LPE fund managers and what the actual reasons behind the IPO really are.

Next, we analyzed the shareholder structure of the LPE fund managers. We found that, at the quarter of the IPO, the major shareholders are institutions and public investors, while strategic owners only represent a small part. Thus, our results indicate that, with a larger share of public investors, LPE fund managers get a more diversified investor base after the IPO which supports hypothesis 2(a) and is in line with previous research such as Cumming et al. (2011). However, the result does not support hypothesis 2(b), as we cannot see a clear pattern that many of the LPs also invest as shareholders. Moreover, we cannot see that they invest with the same investment vehicle (with the mandate to invest in several asset classes) to adjust their exposure to limited partnerships. This could indicate that investing in LPE fund managers is not an optimal way to e.g. maintain the exposure to private equity when receiving realizations from a limited partnership. This could further be derived from the fact that public equity investments in LPE entities act as a bad proxy for limited partnership investments. The result implies that investors, with indicated limited access to limited partnerships, have a higher demand for LPE fund managers and are more frequent

owners of the LPE fund managers as this is the only – although limited – way for them to get exposure to the private equity market.

In addition, we looked at fundraising and fund performance of the LPE fund managers. The study supports hypothesis 3(b) and confirms that fund performance deteriorates significantly after the IPO. Hence, the results are consistent with the common expectation, expressed by Fernyhough and Klees (2019), that the pressures of answering to public shareholders can lead to short-term actions and inefficiencies. It can also be explained by diseconomies of scale in investing, or by the fact that the incentives to perform can be diluted since fund managers sell part of their carry to outside investors when going public. Originally, the limited partnership model was set up so that the fund managers would have an incentive (i.e. carry) to deliver to their LPs. But with more performance fees going to people outside the company, GPs have less incentive to perform.

We found no statistical support for a trade-off between fundraising efforts and performance described by Hudson (2019). While we illustrated that the performance was decreasing after the IPO, the results did not prove that fundraising was increasing significantly after the IPO (hypothesis 3(a)). Instead, one of the regressions revealed that the IPO had a negative impact on fundraising when comparing to a group of private peers. Moreover, some LPE fund managers were growing AUM and management fees more aggressively prior to the IPO. This raises the question of whether the fund managers try to time their IPO when: (1) the growth in the AUM and management fees is high, (2) the funds are performing in the top quartile. This result supports the idea that the reason to go public could be for partners to cash in rather than promoting fundraising and growth, as we can observe no significant growth after the IPO.

As a next step of our analysis, we explored the IPO performance of the seven LPE fund managers. While we confirmed our assumption about the relationship between underpricing and stock liquidity, we did not find enough support for hypothesis 4 since only two LPE fund managers (Blackstone and EQT) demonstrated signs of underpricing. Hence, the results speak against the expectation that LPE fund managers underprice the IPO in order to provide a liquid market for their shares. This can partly be explained by market sentiment, as both EQT and Blackstone went public during a market peak. Another explanation could be that the pre-IPO owners of some LPE fund managers (EQT, Apollo and Oaktree) were selling part of the existing shares in the IPO. While EQT prioritized broadening their ownership base by securing liquidity for their stock and creating enough free float, Apollo and Oaktree could be interested in getting a high price and

avoiding bearing the costs connected with the underpricing. However, it is important to highlight that the IPO process is complex, and thus our arguments does not exclude other explanations.

Finally, we investigated the long-term stock performance of the LPE fund managers. When looking at returns, as well as Sharpe and Treynor ratios, the LPE fund managers' metrics demonstrate higher results compared to the S&P 500. However, CAPM and FF5 regressions demonstrated insignificant alphas for all the LPE fund managers in the sample, confirming the absence of excess returns. All the market betas, on the other hand, are significant at a 0,1% significance level in both CAPM and FF5 regressions. When comparing the market betas of the sample (GPs) to the betas of the LPs, we see a significant difference between them, with GPs having a higher average beta, which supports hypothesis 5. This indicates that buying the LPE fund managers' stocks does not provide the same market exposure as being an LP or buying the stocks of, for example, publicly traded fund-of-funds. Thus, it may also explain the result of hypothesis 2(b), as LPs might not be as interested in the stocks of LPE fund managers since it is not a fair alternative to participating in the fund as an LP.

Based on the results and the discussion above, we have two interesting findings. First, the LPE fund managers in the sample state that funding growth initiatives is the main reason of going public. However, this is not supported by our data. Most of the results indicate that the primary reason might be to realize the value of the equity held by existing owners. This is supported by the fact that the LPE fund managers tend to go public when things look good (high growth in AUM and top quartile performance) and that they are not growing fundraising aggressively after the IPO. Moreover, there is a range of arguments that illustrate how the pre-IPO owners benefitted from the IPO. First, three companies (EQT, Apollo and Oaktree) were selling some secondary shares at the IPO. Secondly, in some firms the IPO proceeds were partly distributed to founders without them selling their shares. For example, Blackstone's co-founder Stephen Schwarzman reportedly earned up to \$677 million from the offering's proceeds. Moreover, his 23% stake in the company has increased in value to more than \$7 billion (Sorkin, 2007). Thirdly, the IPO can be a part of a longer run goal. With the IPO, the stocks of the fund managers have a public value, hence, it is easier to determine their wealth and for founders to sell their shares at a later stage. Some could call it "a kind of estate planning" for the generation that founded these firms, and who are now in their 60s or older (McGee, 2012). In fact, we can see some evidence of that. In the first quarter of 2020, all Carlyle Holding partnership units were exchanged for an equivalent number of shares of the

company's common stock, boosting insiders share to more than 40% of total shares outstanding. Since then, for example, Carlyle's co-founder William E. Conway, Jr. has sold 8 million shares (18% of his stake in the company). Therefore, summing up all the pieces, we believe that the LPE fund managers' primary reason to go public is not having a balance sheet to fund themselves, but rather a chance for a number of individuals to cash out at the right moment.

Secondly, although institutions represent a large part of the shareholders, it is not a majority of the existing LPs that invests as shareholders in the IPO. Instead, we see that it mainly is institutions with indicated limited access to limited partnerships that owns the shares of LPE fund managers. From hypothesis 5 we see that the public equity investment in an LPE fund managers is a bad proxy for a limited partnership with the same LPE fund manager. However, this could be the only way for these institutions to get exposure to the private equity market.

7.2 Limitations

Beyond the limitations specific for each hypothesis, there are three general limitations with our thesis that we would like to highlight. We have limited our thesis to LPE fund managers since little research have been performed on this particular organizational structure of private equity to date. Thus, one limitation of the thesis is that the sample is relatively small. Moreover, we believe it is important to distinguish between the different organizational structures of private equity in order to have a consistent sample. Because of this, and the lack of information for many smaller non-US LPE fund managers, we have a small sample of seven LPE fund managers. The lack of available information also results in that the sample consists of the largest LPE fund managers which could be a limitation to the study as the result may be biased towards the large firms.

Another limitation is the short track record of LPE fund managers, since it is relatively new phenomenon. The first IPO in our sample happened in 2007 (Blackstone), while the latest one – just recently in 2019 (EQT). Hence, the time periods observed might be insufficient to pick up common trends and perform thorough analysis with statistical tests.

A third limitation is the access to data since private equity firms do not have the same reporting requirements as listed firms. As a result, there is very limited information about the LPE fund managers before the IPO. Moreover, lack of information regarding non-listed private equity firms have hindered us in using them as a benchmark and we have therefore used overall market benchmarks, e.g. in the AUM analysis.

8 Conclusion

We started out this paper with the primary goal to provide a broad understanding of a complex phenomenon of listed private equity and to investigate common features between LPE fund managers. Using both a qualitative and quantitative approach, we have identified several common characteristics of private equity fund managers going public.

First, we found that the most common reasons of doing an IPO include funding growth initiatives and expanding employee incentives. Moreover, we confirmed that the LPE fund managers have a more diversified ownership base, that primarily consist of the investors with indicated limited access to limited partnerships, rather than existing LPs. Next, we found that fund performance decreases after the IPO, and the results indicate that the negative trend is true also for fundraising. When analyzing IPO performance, we discovered that only two LPE fund managers demonstrated signs of underpricing, and hence we could not confirm that LPE fund managers underprice the IPO in order to provide a liquid aftermarket. Lastly, we noted that the LPE fund managers have a higher exposure to the market than the LPs investing in the limited partnerships.

From the results of our analysis we have derived two main findings that can conclude the thesis. First, we conclude that the actual main reason to go public is to realize the value of the equity held by existing owners. Several results support this statement. To start with, LPE fund managers tend to time their IPO when the growth in the AUM and management fees is high, and when the funds are performing in the top quartile. Furthermore, they are not growing aggressively after going public, that goes against the “fund growth” motivation stated in their prospectus. In addition, we have evidence of a number of pre-IPO owners (founders in particular) benefitting from the firms going public.

Secondly, we conclude that LPE fund managers get a more diversified investor base after the IPO. Although institutions still represent a large part of the shareholders, it is not mainly the existing LPs that invests as shareholders in the IPO. Instead, it is institutions with indicated limited access to the limited partnerships that have a higher demand for LPE fund managers and are more frequent owners of the LPE fund managers. Although the public equity investment in an LPE fund manager is a bad proxy for a limited partnership with the same LPE fund manager, this could be the only way for these institutions to get exposure to the private equity market.

In this thesis we shed light on the theoretical issues of private equity fund managers going public. We offered a comprehensive analysis of various characteristics of the LPE fund managers, including the reasoning behind going public, the dynamics of public ownership structure, fundraising, fund performance, as well as stock performance. However, we also covered some implications that can be interesting to practitioners, such as LPs invested in private equity funds and asset managers considering buying the stocks of LPE fund managers. For example, an asset manager considering becoming a shareholder in an LPE fund manager to get exposure to the private equity market should be aware of the fact that they will not get the same exposure as investing in a limited partnership, since the LPE fund managers tend to move more with the equity market. This finding is also interesting for those institutions that invest in LPE fund managers for a readjustment mechanism.

There are several ways in which future research could extend these results. First, once more fund managers go public and bigger sample is available, the research can focus on differences between public and private PE fund managers, answering the question “which firms have a bigger probability of going public?”. One could look at frequency of fundraising, investment strategy, geographies and industries of investments, size and number of deals, past performance, types and number of LPs, to name a few.

Secondly, we have shown the initial effects of COVID-19 on the performance of the sample firms’ stocks, however, it is too early to assess the full impact. Future research can explore deeper the consequences of the pandemic and the governments’ measures on the industry.

Thirdly, we concentrate on public ownership in our shareholders analysis, but there are also private investors that we have not covered. For example, China Investment Corporation (CIC), acquired almost a 10 percent stake in Blackstone before its IPO in 2007. Future research can explore the reasoning behind the similar deals from perspective of the both sides, as well as the outcomes.

Fourthly, we have mentioned the conversion to C-Corp structure several times, however this was not the main focus of our research. An event-study can be conducted exploring the effects of the new structure on stock price, fund performance, shareholders structure and liquidity.

Lastly, as we primarily used the data available in open sources, a valuable contribution to our conclusions would be a series of interviews with the companies’ representatives who could provide an insight into the analysis of our results.

9 References

- Bergmann, B., Christophers, H., Huss, M. & Zimmermann, H., 2010. Listed Private Equity. In: *Private Equity. Fund Types, Risks and Returns, and Regulation..* New Jersey: John Wiley & Sons, Inc, pp. 53-70.
- Berk, J. B. & DeMarzo, P. M., 2014. *Corporate Finance*. 3 ed. Harlow, England: Pearson.
- Booth, J. R. & Chua, L., 1996. Ownership dispersion, costly information, and IPO underpricing. *Journal of Financial Economics*, 41(2), pp. 291-310.
- Carlyle, 2020. *Shareholder and Investor Presentation*. s.l.:s.n.
- Copper-Evans, A., 2010. *Listed Private Equity Back on Track*. [Online] [Accessed 23 January 2020].
- Croes, L., 2017. *IPO Underpricing in the US: The Impact of Information Asymmetry on Today's IPO Market*, s.l.: Erasmus University Rotterdam.
- Cumming, D., Fleming, G. & Johan, S. A., 2011. Institutional Investment in Listed Private Equity. *European Financial Management*, 17(3), pp. 594-618.
- Døskeland, T. M. & Strömberg, P., 2018. *Evaluating Investments in Unlisted Equity for the Norweigan Government Pension Fund Global (GPF)*, s.l.: s.n.
- Fama, E. F. & French, K. R., 2004. The Capital Asset Pricing Model: Theory and Evidence. *Journal of Economic Perspectives*, 18(3), pp. 25-46.
- Fama, E. F. & French, K. R., 2014. *A Five-Factor Asset Pricing Model*, s.l.: s.n.
- Fernyhough, W. & Klees, D., 2019. *PitchBook 2Q 2019 Analyst Note: PE Firm Flagship Funds - Public Versus Private*, s.l.: Pitchbook.
- French, K. R., n.d. *Kenneth R. French Data Library*. [Online] Available at: https://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html#Research
- Gara, A., 2020. *Blackstone Now More Valuable Than Goldman Sachs And Morgan Stanley Amid The Coronavirus Chaos*. [Online] Available at: <https://www.forbes.com/sites/antoinegara/2020/03/05/blackstone-overtakes-goldman-sachs-and-morgan-stanley-amid-the-coronavirus-chaos/#62bc5afb400f>
- Gelfer, J., 2018. *1Q 2018 Analyst Note: New Horizons for PE*, s.l.: Pitchbook.
- Gelfer, J. & Fernyhough, W., 2019. *Blackstone's C-Corp Conversion*. Pitchbook.
- Gogineni, S. & Megginson, W. L., 2010. IPOs and Other Nontraditional Fund-Raising Methods of Private Equity Firms. In: *Private Equity. Fund Types, Risks and Returns, and Regulation*. New Jersey: John Wiley & Sons, Inc, pp. 31-51.

- Hardymon, F., Lerner, J. & Leamon, A., 2008. *The Blackstone Group's IPO*. s.l.:s.n.
- Hudson, M., 2019. *Fund Managers: The Complete Guide*. s.l.:Wiley Finance Series.
- Investment Week, n.d. *What is Driving Listed Private Equity*, s.l.: s.n.
- Investor AB, 2019. *Årsredovisning 2019*.
- Jensen, M. C., 1968. The Performance of Mutual Funds in the Period 1945–1964. *The Journal of Finance*, 23(2), pp. 389-416.
- Kallén, G. & Björkqvist, H., 2018. *Underpricing and Underperformance of Swedish IPO's*, s.l.: Jönköping University.
- Kaplan, S. N. & Strömberg, P., 2009. Leveraged Buyouts and Private Equity. *Journal of Economic Perspectives*, 23(1), pp. 121-146.
- Krigman, L., Shaw, W. H. & Womack, K. L., 1999. The Persistence of IPO Mispricing and the Predictive Power of Flipping. *The Journal of Finance*, LIV(3), pp. 1015-1044.
- Kumpf, S., 2013. *Listed Private Equity: Investment Strategies and Returns*. s.l.:Diplomica Verlag.
- Lewis, A., 2019. *Pitchbook*. [Online] Available at: <https://pitchbook.com/news/articles/apollo-becomes-latest-pe-bigwig-to-plan-corporate-conversion?fbclid=IwAR3lBxuMVt2ZfemdJzqGAYtyU3KcYUxf6jCS5eOF1KTq-GudO720wq--q0Y>
- Lundström, S. & Saucedo, L., 2010. *An additional basket to put your eggs in? A study of listed private equity's ability to improve portfolio performance*, Stockholm: Stockholm School of Economics.
- Milne, R., 2014. *Shares in private equity group EQT surge 25% after IPO*. s.l.:s.n.
- McGee, S., 2012. *Carlyle Group: Another IPO Failure for Private Equity*. [Online] Available at: <https://www.thefiscaltimes.com/Columns/2012/05/04/Carlyle-Group-Another-IPO-Failure-for-Private-Equity>
- McElhaney, A., 2019. *Listed Private Equity Firms Are More Aggressive, Data Show*. [Online] Available at: <https://www.institutionalinvestor.com/article/b1fmby15b3w2fh/Listed-Private-Equity-Firms-Are-More-Aggressive-Data-Show>
- Müller, G. & Vasconcelosb, M., 2010. *Listed Private Equity and the Case of Exits*, s.l.: Rotterdam School of Management, Erasmus University.
- Phillips, M. K., 2008. *Should private equity go public?*. [Online] Available at: <https://www.ipe.com/should-private-equity-go-public-/27936.article>
- Preqin, 2016. *The 2016 Preqin Alternative Assets Performance Monitor*, s.l.: s.n.

Preqin, 2018. *Global PE & VC Report*, s.l.: s.n.

Preqin, 2020. *Preqin Global PE & VC Report*, s.l.: s.n.

Reese, Jr., W. A., 1998. *IPO Underpricing, Trading Volume, and Investor Interest*, s.l.: s.n.

Ritter, J. R., 2011. Equilibrium in the Initial Public Offering Market. *Annual Review of Financial Economics*, Volume 3, pp. 347-374.

Ritter, J. R., 2020. *IPO data*. [Online] Available at: <https://site.warrington.ufl.edu/ritter/ipo-data/>

Ritter, J. R. & Welch, I., 2002. A Review of IPO Activity, Pricing, and Allocations. *The Journal of Finance*, LVII(4), pp. 1795-1828.

Sharpe, W. F., 1966. Mutual Fund Performance. *The Journal of Business*, 39(1), pp. 119-138.

Sorkin, A. R., 2007. *Blackstone Group goes Public*. [Online] Available at: <https://www.nytimes.com/2007/06/23/business/worldbusiness/23iht-black.1.6295562.html>

Treynor, J., 1965. How to Rate Management of Investment Funds. *Harvard Business Review*, 43(1), pp. 63-75.

Welch, B., 1947. The Generalization of Student's Problem when Several Different Population Variances are Involved. *Biometrika*, 34(1/2), pp. 28-35.

Yüksel, A. & Yüksel, A., 2006. The Link Between IPO Underpricing and Trading Volume: Evidence from the Istanbul Stock Exchange. *The Journal of Entrepreneurial Finance & Business Ventures*, 11(3), pp. 57-78.

Zheng, S. X., Ogden, J. P. & Jen, F. C., 2005. Pursuing Value Through Liquidity in IPOs: Underpricing, Share Retention, Lockup and Trading Volume Relationships. *Review of Quantitative Finance and Accounting*, 25(3), pp. 293-312.

10 Appendix

Annex A – Reasons for Doing an IPO

Table A.1

Reasons for doing an IPO

The table below describes the reasons for doing an IPO by using information in prospectus as well as annual reports.

Firm	Reasons
Blackstone	<ul style="list-style-type: none"> • Access new sources of capital to invest in existing businesses, expand to complementary businesses and strengthen Blackstone's position as an enduring institution • Enhance Blackstone's brand • Provision of a publicly-traded equity currency and enhancing Blackstone's flexibility in pursuing future strategic acquisitions • Expand the range of financial and retention incentives provided to current and future employees • Permit the realization over time of the value of the equity held by existing owners
KKR	<ul style="list-style-type: none"> • Leverage industry and company research efforts by building new businesses • Expand the range of financial incentives to attract and incentivize people • Provision of a currency for potential future acquisitions
Apollo	<ul style="list-style-type: none"> • Facilitate shareholder liquidity • Fund growth initiatives • General corporate purposes
Oaktree	<ul style="list-style-type: none"> • Will use offering proceeds to acquire interests in the company's business from Oaktree's principals, employees and other investors.
Carlyle	<ul style="list-style-type: none"> • Ability to develop and grow the firm • Strengthen Carlyle's infrastructure • Create attractive investment products, strategies and funds for the benefit of fund investors • Attract and retain top quality professionals
Ares	<ul style="list-style-type: none"> • General corporate purposes • Partially repay outstanding balances under credit facility • Fund growth initiatives • Equity incentive pool
EQT	<ul style="list-style-type: none"> • Increase financial flexibility to allow EQT to invest in its business and pursue growth opportunities by expanding across geographies and investment strategies • Increase the profile of EQT among public investors, business partners and limited partners • Continue to invest in talent and people • Access to capital markets • Broaden the ownership base • Create a more transparent governance structure and sustainable set-up supporting the long-term strategy

Annex B – List of Comparable Firms for Shareholder Analysis

Table B.1

Comparable firms in shareholder analysis

The table below shows the PE firms in our sample and their comparable firms, identified through the following criteria; (1) being listed on one of the major exchanges, (2) IPO date one year before or after the PE firm's IPO date, (3) similar market capitalization at the time of the IPO and (4) sufficient information provided. Only firms that are listed today are included.

PE Firm	Comparable firms
Blackstone	China Pacific Insurance Group Hvratiski Telekom d.d. Reliance Power Limited China Railway Group Limited China Railway Construction Corporation Limited
KKR	Myer Holdings Limited Verisk Analytics, Inc. China Huarong Energy Company Limited Prada S.p.A. China Shipbuilding Industry Company Limited
Apollo	PJSC PhosAgro Sunshine Oilsands Ltd. GSW Immobilien AG Kosmos Energy Ltd. Qualicorp Consultoria e Corretora de Seguros S.A.
Oaktree	Beijing Jingyuntong Technology Co., Ltd Zhejiang Kaishan Compressor Co., Ltd. Jiangsu Hengli Hydraulic Co., Ltd. Billion Industrial Holdings Limited Joeone Co., Ltd.
Carlyle	Groupon, Inc. Talanx AG Jiangsu Phoenix Publishing & Media Corporation Limited Workday, Inc. Kosmos Energy Ltd.
Ares	China Harmony New Energy Auto Holding Limited Fu Shou Yuan International Group Limited HIAG Immobilien Holding AG Sunflower Pharmaceutical Group Co.,Ltd Cheetah Mobile Inc.
EQT	Stadler Rail AG SmileDirectClub, Inc. Aston Martin Lagonda Global Holdings plc StoneCo Ltd. Trainline Plc

Annex C – Shareholders

Table C.1

Shareholders in Blackstone over time

The table below shows the ownership structure for LPE fund managers and its comparable firms in percent at the quarter of the IPO, one year after the IPO, three years after IPO and today (31.12.2019). Each LPE fund manager is compared to the average percentage held of total shares outstanding of their five comparable firms.

Investor Type	Blackstone Percentage held of total shares outstanding				Difference Blackstone vs comparable firms			
	Quarter of IPO	1 year after IPO	3 years after IPO	Today	Quarter of IPO	1 year after IPO	3 years after IPO	Today
INSTITUTIONS	17,06%	77,29%	56,89%	55,91%	3,64%	60,34%	37,17%	29,92%
VC/PE Firm	0,00%	39,44%	29,67%	0,26%	-6,94%	32,50%	24,10%	-3,17%
Traditional Investment Manager	16,07%	30,32%	20,07%	43,69%	11,31%	21,98%	9,00%	28,25%
Bank/Investment Bank	0,02%	4,56%	4,36%	5,67%	-0,48%	4,26%	4,05%	3,69%
Hedge Fund Manager	0,63%	0,97%	1,65%	3,12%	0,63%	0,97%	1,64%	2,85%
Family Offices/Trust	0,06%	0,29%	0,23%	1,99%	0,06%	0,29%	0,23%	1,99%
Corporate Pension Sponsors	0,00%	0,00%	0,00%	0,38%	0,00%	0,00%	-0,26%	-1,97%
Insurance Company	0,00%	0,47%	0,47%	0,11%	-0,01%	0,47%	0,47%	0,03%
Sovereign Wealth Fund	0,00%	0,58%	0,00%	0,01%	-1,19%	-0,72%	-2,38%	-2,04%
Government Pension Sponsor	0,26%	0,65%	0,44%	0,64%	0,26%	0,58%	0,32%	0,37%
Unclassified	0,00%	0,01%	0,00%	0,03%	0,00%	0,01%	0,00%	-0,08%
REITs	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%
Union Pension Sponsor	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%
Charitable Foundations	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	-0,02%	0,00%
INDIVIDUALS/INSIDERS	0,00%	0,04%	0,27%	0,07%	-0,10%	0,04%	0,26%	0,05%
Individuals/Insiders	0,00%	0,04%	0,27%	0,07%	-0,10%	0,04%	0,26%	0,05%
STRATEGIC OWNERS	0,01%	0,02%	0,00%	0,01%	-67,25%	-58,29%	-53,56%	-43,12%
Corporations (Private)	0,00%	0,00%	0,00%	0,00%	-46,08%	-38,40%	-35,61%	-26,22%
Corporations (Public)	0,00%	0,00%	0,00%	0,00%	-19,28%	-19,19%	-17,95%	-16,38%
State Owned Shares	0,00%	0,00%	0,00%	0,00%	-1,90%	-0,72%	0,00%	-0,53%
ESOP	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%
Educational/Cultural Endowment	0,01%	0,02%	0,00%	0,01%	0,01%	0,02%	0,00%	0,01%
OTHER/PUBLIC	82,93%	22,65%	42,84%	44,00%	63,70%	-2,09%	16,14%	13,15%
Other/public*	82,93%	22,65%	42,84%	44,00%	63,70%	-2,09%	16,14%	13,15%

**According to Capital IQ, this is the residual*

Table C.2

Shareholders in KKR over time

The table below shows the ownership structure for LPE fund managers and its comparable firms in percent at the quarter of the IPO, one year after the IPO, three years after IPO and today (31.12.2019). Each LPE fund manager is compared to the average percentage held of total shares outstanding of their five comparable firms.

Investor Type	KKR Percentage held of total shares outstanding				Difference KKR vs comparable firms			
	Quarter of IPO	1 year after IPO	3 years after IPO	Today	Quarter of IPO	1 year after IPO	3 years after IPO	Today
INSTITUTIONS	50,68%	64,80%	65,04%	76,38%	29,11%	37,82%	31,76%	39,58%
VC/PE Firm	0,00%	9,68%	7,06%	0,44%	-0,21%	9,51%	6,81%	-1,12%
Traditional Investment Manager	31,78%	39,27%	46,95%	57,65%	18,07%	19,56%	18,51%	27,75%
Bank/Investment Bank	4,65%	5,66%	3,98%	2,62%	4,32%	5,60%	3,98%	-0,55%
Hedge Fund Manager	12,75%	9,13%	5,84%	14,08%	11,32%	7,22%	4,52%	13,91%
Family Offices/Trust	0,93%	1,06%	1,19%	0,67%	-2,63%	-2,38%	-0,84%	0,46%
Corporate Pension Sponsors	0,00%	0,00%	0,02%	0,01%	0,00%	0,00%	0,02%	0,01%
Insurance Company	0,00%	0,00%	0,00%	0,40%	-1,53%	-0,90%	-0,10%	0,40%
Sovereign Wealth Fund	0,00%	0,00%	0,00%	0,00%	-0,60%	-0,44%	-0,42%	-0,24%
Government Pension Sponsor	0,57%	0,00%	0,00%	0,49%	0,38%	-0,36%	-0,72%	-0,41%
Unclassified	0,00%	0,00%	0,00%	0,01%	0,00%	0,00%	0,00%	-0,63%
REITs	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%
Union Pension Sponsor	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%
Charitable Foundations	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%
INDIVIDUALS/INSIDERS	2,23%	2,10%	2,14%	4,77%	-11,20%	-9,99%	-8,48%	-1,52%
Individuals/Insiders	2,23%	2,10%	2,14%	4,77%	-11,20%	-9,99%	-8,48%	-1,52%
STRATEGIC OWNERS	0,00%	2,12%	1,63%	0,00%	-31,57%	-24,70%	-29,86%	-27,18%
Corporations (Private)	0,00%	2,12%	1,63%	0,00%	-30,78%	-23,54%	-27,46%	-26,41%
Corporations (Public)	0,00%	0,00%	0,00%	0,00%	-0,79%	-0,84%	-2,40%	-0,77%
State Owned Shares	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%
ESOP	0,00%	0,00%	0,00%	0,00%	0,00%	-0,32%	0,00%	0,00%
Educational/Cultural Endowment	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%
OTHER/PUBLIC	47,09%	30,99%	31,19%	18,86%	13,66%	-3,13%	6,58%	-10,88%
Other/public*	47,09%	30,99%	31,19%	18,86%	13,66%	-3,13%	6,58%	-10,88%

*According to Capital IQ, this is the residual

Table C.3

Shareholders in Apollo over time

The table below shows the ownership structure for LPE fund managers and its comparable firms in percent at the quarter of the IPO, one year after the IPO, three years after IPO and today (31.12.2019). Each LPE fund manager is compared to the average percentage held of total shares outstanding of their five comparable firms.

Investor Type	Apollo Percentage held of total shares outstanding				Difference Apollo vs comparable firms			
	Quarter of IPO	1 year after IPO	3 years after IPO	Today	Quarter of IPO	1 year after IPO	3 years after IPO	Today
INSTITUTIONS	24,14%	42,09%	68,15%	71,41%	-26,96%	-9,75%	29,42%	34,39%
VC/PE Firm	0,00%	0,17%	0,20%	0,92%	-29,21%	-26,13%	-18,07%	0,89%
Traditional Investment Manager	17,32%	35,22%	36,24%	43,59%	-1,95%	15,14%	20,75%	14,83%
Bank/Investment Bank	6,16%	4,23%	5,68%	5,53%	5,67%	2,54%	4,39%	3,09%
Hedge Fund Manager	0,57%	2,39%	10,64%	19,86%	0,25%	2,21%	9,63%	18,19%
Family Offices/Trust	0,00%	0,02%	0,03%	0,32%	-0,01%	-0,03%	0,03%	0,23%
Corporate Pension Sponsors	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	-0,04%	-1,15%
Insurance Company	0,00%	0,03%	0,00%	0,26%	0,00%	0,03%	0,00%	0,26%
Sovereign Wealth Fund	0,00%	0,00%	0,00%	0,00%	-1,75%	-2,68%	-2,02%	0,00%
Government Pension Sponsor	0,08%	0,00%	15,35%	0,92%	0,04%	-0,78%	14,75%	0,09%
Unclassified	0,00%	0,00%	0,00%	0,01%	0,00%	0,00%	0,00%	-2,05%
REITs	0,00%	0,00%	0,00%	0,00%	-0,01%	-0,07%	0,00%	0,00%
Union Pension Sponsor	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%
Charitable Foundations	0,00%	0,02%	0,02%	0,00%	0,00%	0,02%	0,02%	0,00%
INDIVIDUALS/INSIDERS	4,11%	1,64%	3,30%	8,97%	1,60%	-5,35%	-4,85%	-5,62%
Individuals/Insiders	4,11%	1,64%	3,30%	8,97%	1,60%	-5,35%	-4,85%	-5,62%
STRATEGIC OWNERS	0,00%	0,00%	0,00%	1,40%	-13,49%	-15,26%	-31,77%	-28,54%
Corporations (Private)	0,00%	0,00%	0,00%	1,36%	-13,49%	-15,26%	-13,37%	-9,76%
Corporations (Public)	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	-18,40%	-18,79%
State Owned Shares	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%
ESOP	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%
Educational/Cultural Endowment	0,00%	0,00%	0,00%	0,04%	0,00%	0,00%	0,00%	0,01%
OTHER/PUBLIC	71,75%	56,28%	28,55%	18,21%	38,85%	30,36%	7,20%	-0,23%
Other/public*	71,75%	56,28%	28,55%	18,21%	38,85%	30,36%	7,20%	-0,23%

*According to Capital IQ, this is the residual

Table C.4

Shareholders in Oaktree over time

The table below shows the ownership structure for LPE fund managers and its comparable firms in percent at the quarter of the IPO, one year after the IPO, three years after IPO and today (31.12.2019). Each LPE fund manager is compared to the average percentage held of total shares outstanding of their five comparable firms. The large difference in the numbers today are due to the acquisition of Oaktree in 2019.

Investor Type	Oaktree Percentage held of total shares outstanding				Difference Oaktree vs comparable firms			
	Quarter of IPO	1 year after IPO	3 years after IPO	Today	Quarter of IPO	1 year after IPO	3 years after IPO	Today
INSTITUTIONS	88,93%	75,44%	73,47%	100,00%	67,06%	47,98%	49,99%	82,20%
VC/PE Firm	1,35%	0,60%	0,11%	0,00%	-14,17%	-15,37%	-13,49%	-7,59%
Traditional Investment Manager	34,71%	43,07%	57,94%	42,11%	31,37%	34,73%	52,34%	36,49%
Bank/Investment Bank	1,68%	9,27%	8,12%	53,70%	1,68%	9,27%	8,12%	53,19%
Hedge Fund Manager	51,19%	22,09%	5,58%	4,19%	51,19%	22,09%	5,58%	4,19%
Family Offices/Trust	0,00%	0,31%	1,47%	0,00%	0,00%	0,31%	1,47%	0,00%
Corporate Pension Sponsors	0,00%	0,00%	0,00%	0,00%	-0,05%	0,00%	0,00%	0,00%
Insurance Company	0,00%	0,00%	0,00%	0,00%	-0,04%	0,00%	-0,18%	0,00%
Sovereign Wealth Fund	0,00%	0,00%	0,00%	0,00%	-0,08%	-0,24%	-1,27%	-0,78%
Government Pension Sponsor	0,00%	0,08%	0,18%	0,00%	0,00%	0,02%	0,18%	-0,21%
Unclassified	0,00%	0,02%	0,07%	0,00%	-2,85%	-2,83%	-2,78%	-3,08%
REITs	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%
Union Pension Sponsor	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%
Charitable Foundations	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%
INDIVIDUALS/INSIDERS	0,08%	0,09%	0,11%	0,00%	-29,26%	-30,54%	-20,04%	-20,48%
Individuals/Insiders	0,08%	0,09%	0,11%	0,00%	-29,26%	-30,54%	-20,04%	-20,48%
STRATEGIC OWNERS	0,04%	0,04%	0,03%	0,00%	-16,92%	-25,94%	-39,42%	-40,99%
Corporations (Private)	0,04%	0,03%	0,03%	0,00%	-16,81%	-25,95%	-39,42%	-40,84%
Corporations (Public)	0,00%	0,00%	0,00%	0,00%	-0,11%	0,00%	0,00%	0,00%
State Owned Shares	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%
ESOP	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	-0,15%
Educational/Cultural Endowment	0,00%	0,01%	0,00%	0,00%	0,00%	0,01%	0,00%	0,00%
OTHER/PUBLIC	10,95%	24,42%	26,40%	0,00%	-20,88%	8,50%	9,47%	-20,73%
Other/public*	10,95%	24,42%	26,40%	0,00%	-20,88%	8,50%	9,47%	-20,73%

*According to Capital IQ, this is the residual

Table C.5

Shareholders in Carlyle over time

The table below shows the ownership structure for LPE fund managers and its comparable firms in percent at the quarter of the IPO, one year after the IPO, three years after IPO and today (31.12.2019). Each LPE fund manager is compared to the average percentage held of total shares outstanding of their five comparable firms.

Investor Type	Carlyle Percentage held of total shares outstanding				Difference Carlyle vs comparable firms			
	Quarter of IPO	1 year after IPO	3 years after IPO	Today	Quarter of IPO	1 year after IPO	3 years after IPO	Today
INSTITUTIONS	61,26%	60,95%	59,27%	46,90%	20,40%	20,08%	12,89%	-3,44%
VC/PE Firm	0,00%	0,47%	0,37%	0,42%	-27,26%	-20,51%	-14,13%	-1,07%
Traditional Investment Manager	56,49%	43,55%	38,81%	31,90%	45,08%	27,74%	13,06%	-6,00%
Bank/Investment Bank	2,37%	7,54%	13,99%	9,64%	2,24%	6,89%	13,31%	7,71%
Hedge Fund Manager	2,39%	9,25%	5,58%	3,92%	1,02%	6,62%	1,45%	-3,12%
Family Offices/Trust	0,00%	0,11%	0,31%	0,78%	-0,06%	-0,11%	0,26%	0,54%
Corporate Pension Sponsors	0,00%	0,00%	0,00%	0,00%	0,00%	-0,01%	-0,02%	-0,01%
Insurance Company	0,00%	0,00%	0,05%	0,00%	0,00%	0,00%	-0,03%	0,00%
Sovereign Wealth Fund	0,00%	0,00%	0,00%	0,00%	-0,55%	-0,41%	-0,41%	-0,54%
Government Pension Sponsor	0,00%	0,00%	0,17%	0,22%	-0,06%	-0,14%	-0,60%	-0,93%
Unclassified	0,00%	0,02%	0,00%	0,02%	0,00%	0,02%	0,00%	0,02%
REITs	0,00%	0,00%	0,00%	0,00%	0,00%	-0,02%	0,00%	0,00%
Union Pension Sponsor	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%
Charitable Foundations	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	-0,04%
INDIVIDUALS/INSIDERS	0,00%	0,36%	0,78%	2,90%	-19,22%	-16,48%	-13,42%	-6,23%
Individuals/Insiders	0,00%	0,36%	0,78%	2,90%	-19,22%	-16,48%	-13,42%	-6,23%
STRATEGIC OWNERS	0,00%	0,00%	0,00%	0,00%	-30,94%	-30,29%	-30,27%	-25,41%
Corporations (Private)	0,00%	0,00%	0,00%	0,00%	-30,94%	-30,28%	-30,27%	-25,37%
Corporations (Public)	0,00%	0,00%	0,00%	0,00%	-0,01%	-0,01%	0,00%	0,00%
State Owned Shares	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	-0,01%
ESOP	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%
Educational/Cultural Endowment	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	-0,03%
OTHER/PUBLIC	38,74%	38,69%	39,95%	50,21%	29,76%	26,69%	30,80%	35,09%
Other/public*	38,74%	38,69%	39,95%	50,21%	29,76%	26,69%	30,80%	35,09%

*According to Capital IQ, this is the residual

Table C.6

Shareholders in Ares over time

The table below shows the ownership structure for LPE fund managers and its comparable firms in percent at the quarter of the IPO, one year after the IPO, three years after IPO and today (31.12.2019). Each LPE fund manager is compared to the average percentage held of total shares outstanding of their five comparable firms.

Investor Type	Ares Percentage held of total shares outstanding				Difference Ares vs comparable firms			
	Quarter of IPO	1 year after IPO	3 years after IPO	Today	Quarter of IPO	1 year after IPO	3 years after IPO	Today
INSTITUTIONS	11,77%	12,21%	15,06%	93,42%	4,90%	4,61%	5,92%	83,73%
VC/PE Firm	0,03%	0,00%	0,07%	27,22%	-2,63%	-1,40%	-0,05%	27,22%
Traditional Investment Manager	10,44%	11,83%	11,66%	59,17%	7,08%	7,59%	5,64%	51,88%
Bank/Investment Bank	0,04%	0,36%	1,56%	2,83%	-0,11%	-0,47%	1,48%	2,74%
Hedge Fund Manager	1,26%	0,01%	1,77%	3,30%	0,99%	-0,21%	1,50%	2,93%
Family Offices/Trust	0,00%	0,01%	0,01%	0,08%	-0,02%	0,00%	0,00%	0,08%
Corporate Pension Sponsors	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%
Insurance Company	0,00%	0,00%	0,00%	0,34%	-0,01%	-0,01%	-1,62%	-1,00%
Sovereign Wealth Fund	0,00%	0,00%	0,00%	0,00%	-0,37%	-0,35%	-0,17%	-0,17%
Government Pension Sponsor	0,00%	0,00%	0,00%	0,46%	-0,02%	-0,54%	-0,87%	0,00%
Unclassified	0,00%	0,00%	0,00%	0,03%	0,00%	0,00%	0,00%	0,03%
REITs	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%
Union Pension Sponsor	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%
Charitable Foundations	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%
INDIVIDUALS/INSIDERS	0,09%	0,04%	0,50%	0,71%	-19,13%	-24,46%	-19,55%	-17,24%
Individuals/Insiders	0,09%	0,04%	0,50%	0,71%	-19,13%	-24,46%	-19,55%	-17,24%
STRATEGIC OWNERS	0,00%	0,00%	0,00%	0,04%	-36,74%	-42,56%	-42,16%	-42,45%
Corporations (Private)	0,00%	0,00%	0,00%	0,04%	-22,53%	-29,82%	-27,38%	-27,70%
Corporations (Public)	0,00%	0,00%	0,00%	0,00%	-14,12%	-12,68%	-14,78%	-14,76%
State Owned Shares	0,00%	0,00%	0,00%	0,00%	-0,09%	-0,05%	0,00%	0,00%
ESOP	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%
Educational/Cultural Endowment	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%
OTHER/PUBLIC	88,14%	87,75%	84,43%	5,83%	50,97%	62,40%	55,80%	-24,03%
Other/public*	88,14%	87,75%	84,43%	5,83%	50,97%	62,40%	55,80%	-24,03%

*According to Capital IQ, this is the residual

Table C.7**Shareholders in EQT over time**

The table below shows the ownership structure for LPE fund managers and its comparable firms in percent at the quarter of the IPO. Each LPE fund manager is compared to the average percentage held of total shares outstanding of their five comparable firms.

Investor Type	EQT Percentage held of total shares outstanding	Difference EQT vs comparable firms
	Quarter of IPO	Quarter of IPO
INSTITUTIONS	21,80%	-21,80%
VC/PE Firm	18,29%	2,46%
Traditional Investment Manager	3,51%	-15,89%
Bank/Investment Bank	0,00%	-0,63%
Hedge Fund Manager	0,00%	-7,19%
Family Offices/Trust	0,00%	-0,34%
Corporate Pension Sponsors	0,00%	-0,03%
Insurance Company	0,00%	0,00%
Sovereign Wealth Fund	0,00%	-0,01%
Government Pension Sponsor	0,00%	-0,16%
Unclassified	0,00%	-0,01%
REITs	0,00%	0,00%
Union Pension Sponsor	0,00%	0,00%
Charitable Foundations	0,00%	0,00%
INDIVIDUALS/INSIDERS	44,95%	28,63%
Individuals/Insiders	44,95%	28,63%
STRATEGIC OWNERS	0,00%	-9,26%
Corporations (Private)	0,00%	-7,37%
Corporations (Public)	0,00%	-1,86%
State Owned Shares	0,00%	0,00%
ESOP	0,00%	-0,03%
Educational/Cultural Endowment	0,00%	0,00%
OTHER/PUBLIC	33,25%	2,43%
Other/public*	33,25%	2,43%

*According to Capital IQ, this is the residual

Annex D – LPs Investing as Shareholders

Table D.1

LP and shareholder analysis at the quarter of the IPO

The table below shows the LPs that also are invested as shareholders at the quarter of the IPO. The LP column shows the LP name which matched to the shareholder name in the shareholder column. Please note that a couple of the investors are not using the same investment vehicle as an LP and as a shareholder. The row total is the total number of LPs and shareholders respectively. Oaktree is excluded from the table as no matches were found.

	LP	Shareholder
Blackstone	AXA Winterthur	AXA Investment Managers S.A.
	Glenmede	Glenmede Trust Company, N.A.
	Invesco Private Capital	Invesco Ltd. (NYSE:IVZ)
	Manulife Financial Corporation	Manulife Asset Management
	Ohio Public Employees Retirement System	Ohio Public Employees Retirement System
	UBS	UBS Asset Management
Total	224	116
KKR	Aberdeen Standard Investments	Aberdeen Asset Management PLC
	Citigroup Pension Fund	Citigroup Inc., Banking and Securities Investments
	Goldman Sachs AIMS Private Equity	Goldman Sachs Group, Investment Banking and Securities Investments
	Neuberger Berman	Neuberger Berman BD LLC
Total	93	96
Apollo	California State Teachers Retirement System (CalSTRS)	California State Teachers Retirement System
	Credit Suisse Placement Foundation	Credit Suisse, Investment Banking and Securities Investments
Total	146	38
Carlyle	Credit Suisse Placement Foundation	Credit Suisse, Investment Banking and Securities Investments
	Credit Suisse	Credit Suisse, Investment Banking and Securities Investments
	Manulife Capital	Manulife Asset Management
	Nomura International	Nomura Holdings Inc, Securities & Investment Arm
	State of Wisconsin Investment Board	State of Wisconsin Investment Board
Total	303	53
Ares	Citigroup Pension Fund	Citigroup Inc., Banking and Securities Investments
Total	55	41
EQT	Allianz Capital Partners	Allianz Asset Management AG
	Allianz Group	Allianz Asset Management AG
	Aviva Investors Multi-Manager	Aviva Investors Global Services Limited
	Danske Bank	Danske Bank A/S, Asset Management Arm
	DNB Private Equity	DNB Asset Management AS
	Investor AB	Investor AB (publ) (OM:INVE A)
	Neuberger Berman	Neuberger Berman BD LLC
	Nordea Bank Danmark A/S	Nordea Investment Management AB
	Nordea Bank	Nordea Investment Management AB
	Nordea Life & Pensions	Nordea Investment Management AB
	Nykredit	Nykredit Portefølje Administration A/S
	Nykredit	Nykredit Asset Management A/S
	PFA Pension	PFA Kapitalforvaltning, Fondsmæglerselskab A/S
	SEB Pension	SEB Investment Management AB
	UBS Multi-Manager Private Equity and Infrastructure	UBS Asset Management
Total	201	60

Table D.2

LP and shareholder analysis today, as of 31.12.2019

The table below shows the LPs that also are invested as shareholders at the quarter of the IPO. The LP column shows the LP name which matched to the shareholder name in the shareholder column. Please note that a couple of the investors are not using the same investment vehicle as an LP and as a shareholder. The row total is the total number of LPs and shareholders respectively. Oaktree is excluded from the table as no matches were found.

	LP	Shareholder
Blackstone	Ameritas Life Insurance Corp. AP Fonden 2 British Columbia Investment Management Corporation California Public Employees Retirement System California State Teachers Retirement System (CalSTRS) Canada Pension Plan Investment Board Florida State Board of Administration Shell Retirement Fund (US) State of Wisconsin Investment Board Transamerica	Ameritas Investment Corp., Asset Management Arm AP Fonden 2 British Columbia Investment Management Corporation California Public Employees Retirement System California State Teachers Retirement System Canada Pension Plan Investment Board Florida State Board of Administration Shell Asset Management Company B.V. State of Wisconsin Investment Board Transamerica Asset Management, Inc.
Total	128	1176
KKR	Arizona State Retirement System AXA Winterthur California Public Employees Retirement System California State Teachers Retirement System (CalSTRS) Citigroup Pension Fund Credit Suisse Placement Foundation Credit Suisse Placement Foundation Florida State Board of Administration HSBC Group LGT Capital Partners Manulife Financial Corporation Mitsubishi UFJ Financial Group Bank Mitsubishi UFJ Financial Group Bank Northwestern Mutual Life Insurance Company Partners Group Private Equity Performance Holding Partners Group Private Equity Performance Holding Partners Group Partners Group Sumitomo Corporation Sumitomo Corporation Sumitomo Mitsui Trust Bank Sumitomo Mitsui Trust Bank Sumitomo Mitsui Banking Corporation Sumitomo Mitsui Banking Corporation	Arizona State Retirement System AXA Investment Managers S.A. California Public Employees Retirement System California State Teachers Retirement System Citigroup Inc., Banking and Securities Investments Credit Suisse Asset Management (Switzerland) Credit Suisse, Investment Banking and Securities Investments Florida State Board of Administration HSBC Global Asset Management (UK) Limited LGT Capital Partners Ltd. Manulife Asset Management Mitsubishi UFJ Trust and Banking Corporation, Asset Management Mitsubishi UFJ Kokusai Asset Management Co., Ltd. Northwestern Mutual Wealth Management Company Partners Group Holding AG (SWX:PGHN) Partners Capital Investment Group LLC Partners Group Holding AG (SWX:PGHN) Partners Capital Investment Group LLC Sumitomo Mitsui DS Asset Management Company, Limited Sumitomo Mitsui Trust Asset Management Co., Ltd. Sumitomo Mitsui DS Asset Management Company, Limited Sumitomo Mitsui Trust Asset Management Co., Ltd. Sumitomo Mitsui DS Asset Management Company, Limited Sumitomo Mitsui Trust Asset Management Co., Ltd.
Total	108	688
Apollo	Ameritas Life Insurance Corp. British Columbia Investment Management Corporation California Public Employees Retirement System Canada Pension Plan Investment Board Goldman Sachs Foundation	Ameritas Investment Corp., Asset Management Arm British Columbia Investment Management Corporation California Public Employees Retirement System Canada Pension Plan Investment Board Goldman Sachs Asset Management, L.P.

	Goldman Sachs Foundation	Goldman Sachs Group, Investment Banking and Securities Investments
	Northwestern Mutual Life Insurance Company	Northwestern Mutual Wealth Management Company
Total	109	433
Carlyle	BBVA Asset Management Brown Advisory California Public Employees Retirement System HSBC Alternative Investments HSBC Private Bank Manulife Capital Partners Group Pictet Alternative Advisors	BBVA Asset Management, S.A., S.G.I.I.C. Brown Advisory Incorporated California Public Employees Retirement System HSBC Global Asset Management (UK) Limited HSBC Global Asset Management (UK) Limited Manulife Asset Management (Taiwan) Co., Limited Partners Group Holding AG (SWX:PGHN) Pictet Bank & Trust Limited, Asset Management Arm
Total	177	250
Ares	California Public Employees Retirement System California State Teachers Retirement System (CalSTRS) Nationwide Insurance New York State Common Retirement Fund State Teachers Retirement System of Ohio Teachers Retirement System of the City of New York	California Public Employees Retirement System California State Teachers Retirement System Nationwide Fund Advisors New York State Common Retirement Fund State Teachers Retirement System of Ohio Teachers Insurance and Annuity Association of America
Total	43	255
EQT	Allianz Capital Partners Allianz Group AP Fonden 4 AP Fonden 2 Aviva Investors Multi-Manager Danske Bank Danske Bank DNB Private Equity GIC Investor AB Mercer Private Markets Neuberger Berman Nordea Bank Danmark A/S Nordea Life & Pensions Nordea Bank Nykredit Nykredit Partners Group Partners Group Private Equity Performance Holding PFA Pension SEB Pension UBS Multi-Manager Private Equity and Infrastructure	Allianz Asset Management AG Allianz Asset Management AG AP Fonden 4 AP Fonden 2 Aviva Investors Global Services Limited Danske Capital AB Danske Bank A/S, Asset Management Arm DNB Asset Management AS GIC Pte. Ltd. Investor AB (publ) (OM:INVE A) Mercer Limited, Asset Management Arm Neuberger Berman BD LLC Nordea Investment Management AB Nordea Investment Management AB Nordea Investment Management AB Nykredit Portefølje Administration A/S Nykredit Asset Management A/S Partners Group Holding AG (SWX:PGHN) Partners Group Holding AG (SWX:PGHN) PFA Kapitalforvaltning, Fondsmæglerselskab A/S SEB Investment Management AB UBS Asset Management
Total	201	105

Annex E – Growth in AUM for Each LPE Fund Manager

Figure E.1

Blackstone - Assets Under Management (\$ in billions)

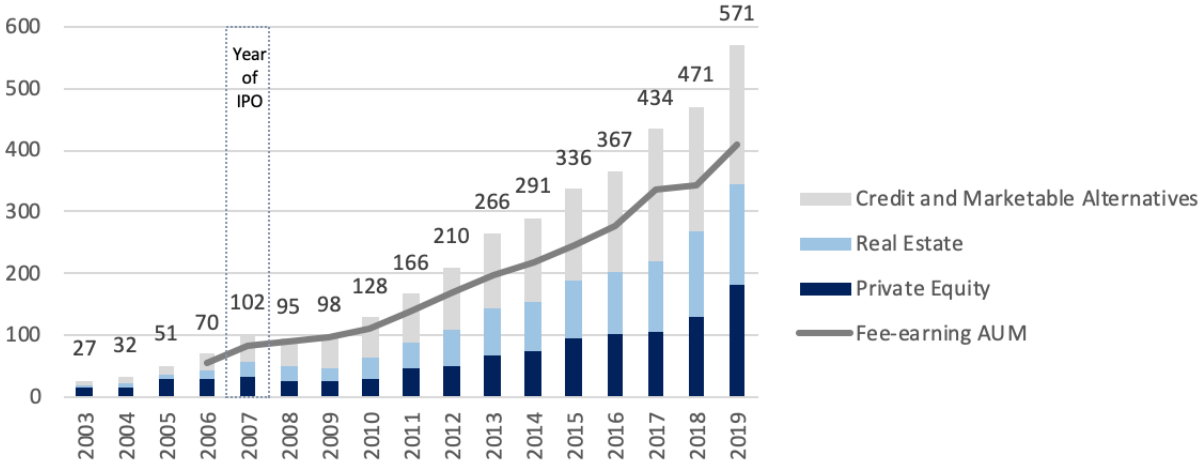


Figure E.2

KKR - Assets Under Management (\$ in billions)

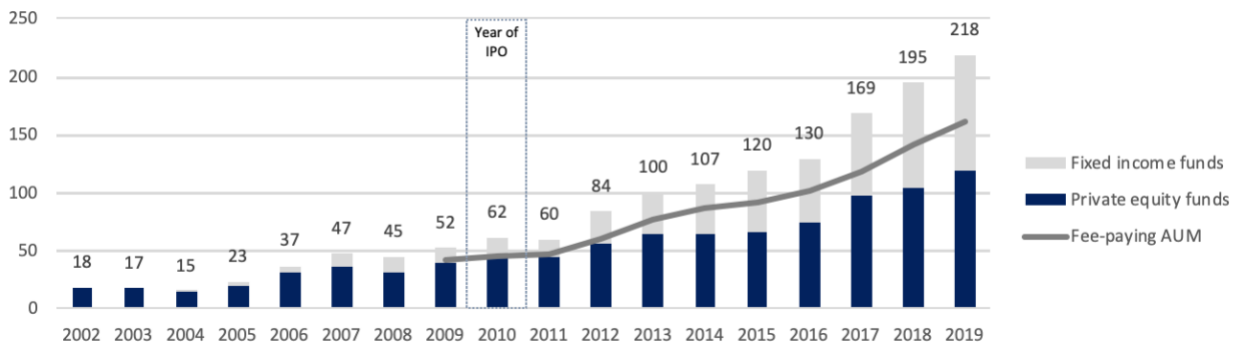


Figure E.3

Apollo - Assets Under Management (\$ in billions)

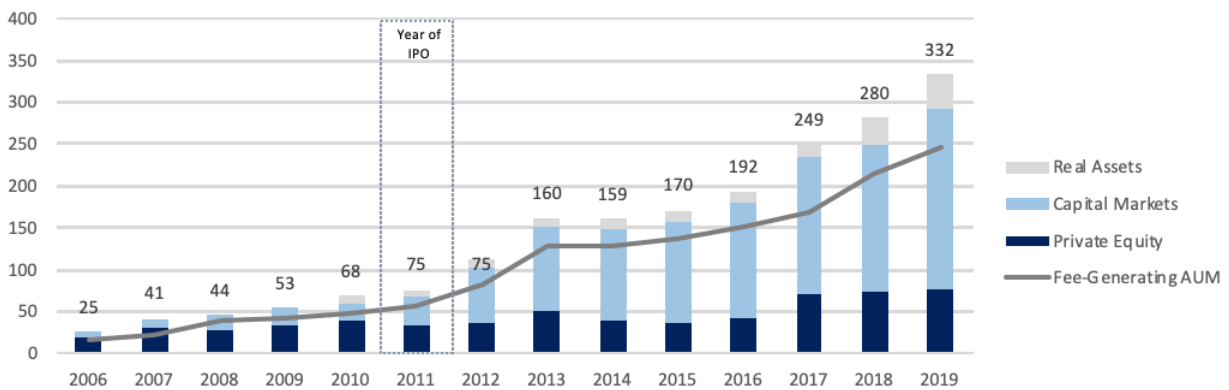
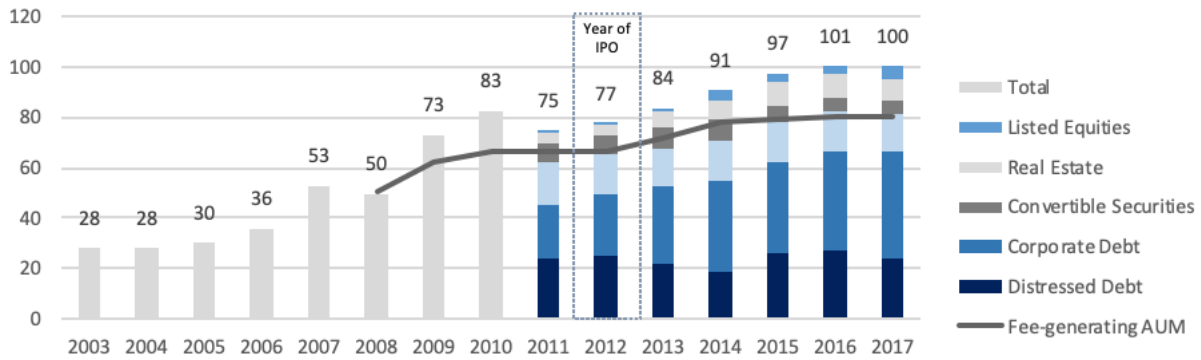


Figure E.4
Oaktree - Assets Under Management (\$ in billions)



Before 2011, we did not find data for the different segments. Data from 2018 not comparable due to change in classification

E.5
Carlyle - Assets Under Management (\$ in billions)

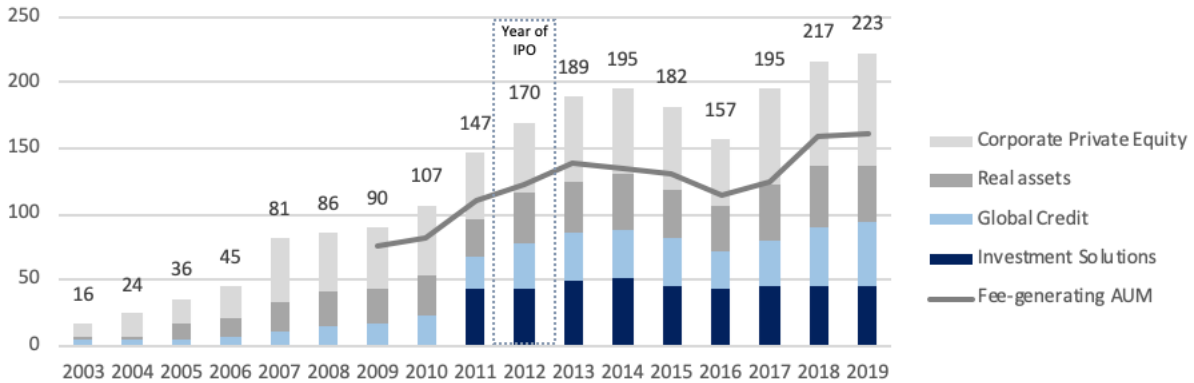
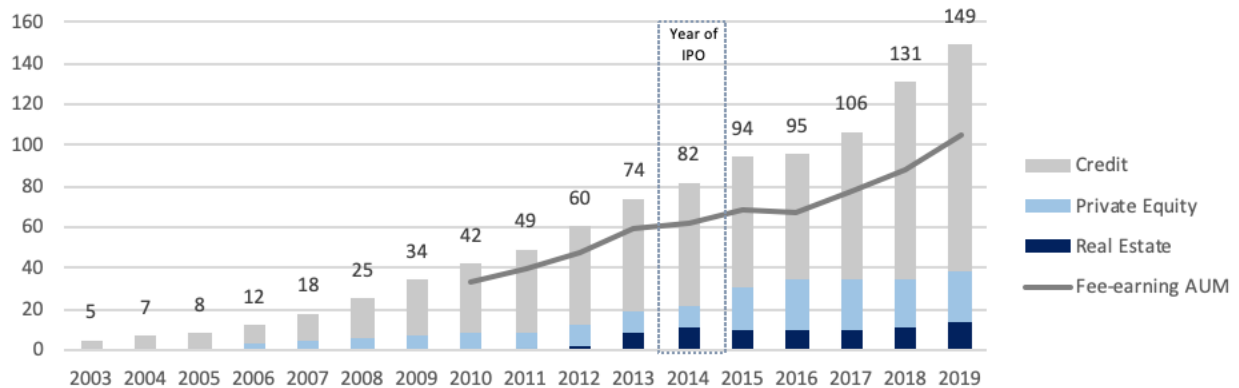
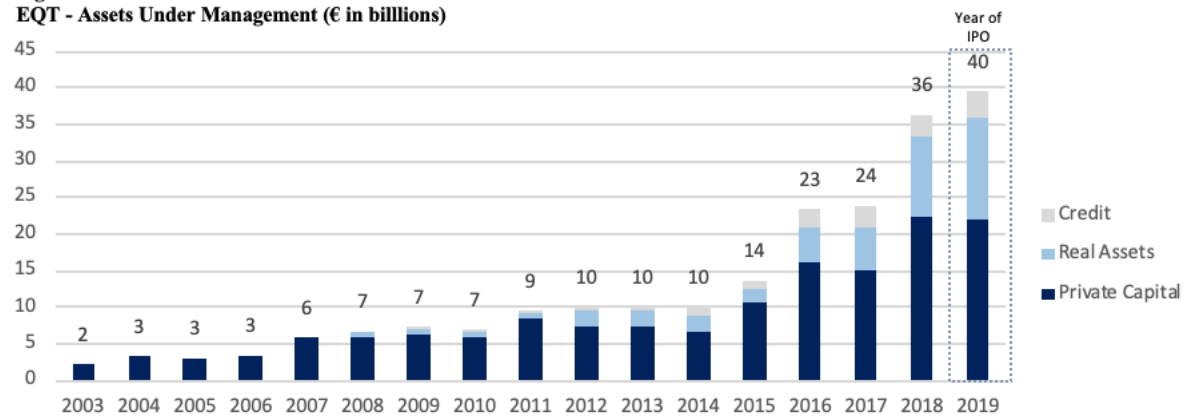


Figure E.6
Ares - Assets Under Management (\$ in billions)



In 2016, the proforma includes \$3.6 billion from the acquisition of ACAS which is not included here.

Figure E.7
EQT - Assets Under Management (€ in billions)



Fee-generating AUM could not be found.

Annex F – Historical Revenue Structure

Table F.1

Revenue structure

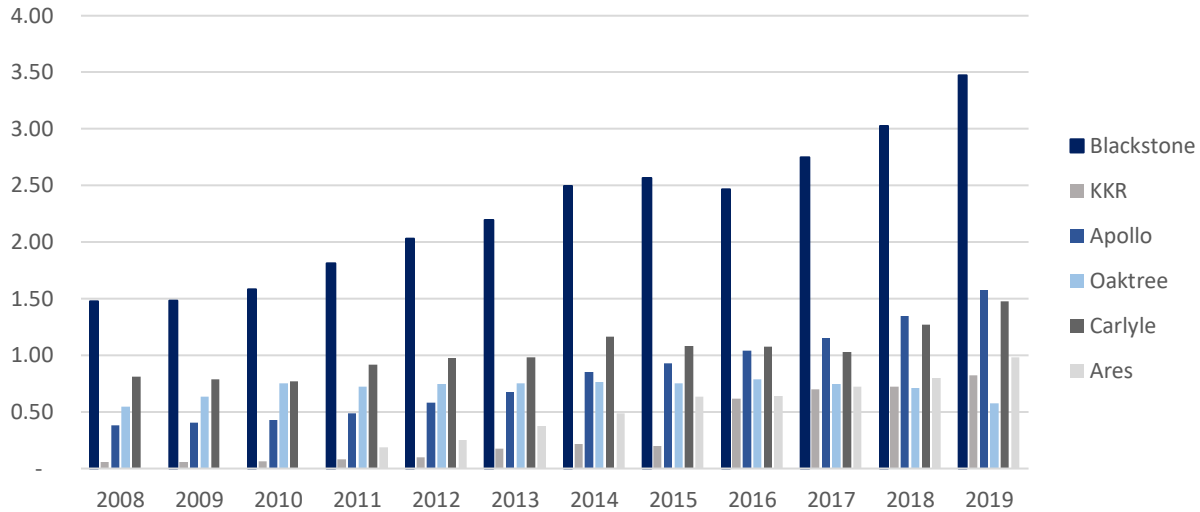
The table below shows the revenue structure for the seven LPE fund managers examined. The LPE fund managers' IPO year is marked in grey. MF stands for management fees, PF - performance fees. The numbers are stated in billions USD, apart from EQT that is stated in billions EUR.

		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Blackstone	MF	0,48	1,08	1,57	1,48	1,48	1,58	1,81	2,03	2,19	2,50	2,57	2,46	2,75	3,03	3,47
	PF	0,88	1,27	1,13	-1,25	0,22	0,94	1,18	1,59	3,54	4,37	0,17	0,15	0,24	0,06	0,13
	Other	0,21	0,27	0,36	-0,58	0,07	0,60	0,26	0,40	0,88	0,61	1,95	2,53	4,15	3,75	3,74
	Total	1,57	2,62	3,05	-0,35	1,77	3,12	3,25	4,02	6,61	7,48	4,68	5,15	7,15	6,83	7,34
KKR	MF	n.i.	n.i.	n.i.	0,06	0,06	0,06	0,08	0,10	0,18	0,22	0,20	0,62	0,70	0,72	0,82
	PF	n.i.	n.i.	n.i.	0,00	0,00	0,04	0,03	0,04	0,07	0,05	0,02	0,81	1,75	0,46	2,04
	Other	n.i.	n.i.	n.i.	0,18	0,27	0,33	0,61	0,43	0,52	0,84	0,83	0,48	0,84	1,22	1,35
	Total	n.i.	n.i.	n.i.	0,24	0,33	0,44	0,72	0,57	0,76	1,11	1,04	1,91	3,28	2,40	4,22
Apollo	MF	n.i.	n.i.	0,19	0,38	0,41	0,43	0,49	0,58	0,67	0,85	0,93	1,04	1,15	1,35	1,58
	PF	n.i.	n.i.	0,29	-0,80	0,50	1,60	-0,40	2,13	2,86	0,39	0,10	0,78	1,34	-0,36	1,23
	Other	n.i.	n.i.	0,15	0,15	0,06	0,08	0,08	0,15	0,20	0,32	0,01	0,15	0,12	0,11	0,12
	Total	n.i.	n.i.	0,64	-0,27	0,97	2,11	0,17	2,86	3,73	1,56	1,04	1,97	2,61	1,09	2,93
Oaktree	MF	n.i.	n.i.	n.i.	0,54	0,64	0,75	0,72	0,75	0,75	0,76	0,75	0,79	0,75	0,71	0,58
	PF	n.i.	n.i.	n.i.	0,17	0,18	0,41	0,30	0,46	1,03	0,49	0,26	0,36	0,73	0,67	0,35
	Other	n.i.	n.i.	n.i.	-0,15	0,29	0,15	0,02	0,20	0,26	0,12	0,05	0,22	0,25	0,16	0,15
	Total	n.i.	n.i.	n.i.	0,57	1,10	1,31	1,05	1,41	2,04	1,37	1,07	1,36	1,73	1,54	1,08
Carlyle	MF	n.i.	n.i.	n.i.	0,81	0,79	0,77	0,92	0,98	0,98	1,17	1,09	1,08	1,03	1,27	1,48
	PF	n.i.	n.i.	n.i.	-0,88	0,50	1,48	1,12	1,04	2,38	1,67	0,82	0,75	2,09	0,65	0,84
	Other	n.i.	n.i.	n.i.	-0,05	0,03	0,55	0,81	0,95	1,08	1,04	1,10	0,45	0,56	0,50	1,07
	Total	n.i.	n.i.	n.i.	-0,12	1,32	2,80	2,85	2,97	4,44	3,88	3,01	2,27	3,68	2,43	3,38
Ares	MF	n.i.	n.i.	n.i.	n.i.	n.i.	n.i.	0,19	0,25	0,38	0,49	0,63	0,64	0,72	0,80	0,98
	PF	n.i.	n.i.	n.i.	n.i.	n.i.	n.i.	0,01	0,07	0,08	0,09	0,15	0,52	0,64	0,11	0,69
	Other	n.i.	n.i.	n.i.	n.i.	n.i.	n.i.	0,01	0,01	0,02	0,03	0,03	0,04	0,06	0,05	0,04
	Total	n.i.	n.i.	n.i.	n.i.	n.i.	n.i.	0,21	0,33	0,48	0,60	0,81	1,20	1,42	0,96	1,71
EQT	MF	n.i.	n.i.	n.i.	n.i.	n.i.	n.i.	n.i.	n.i.	n.i.	n.i.	n.i.	0,24	0,32	0,38	0,57
	PF&Other	n.i.	n.i.	n.i.	n.i.	n.i.	n.i.	n.i.	n.i.	n.i.	n.i.	n.i.	0,01	0,00	0,01	0,03
	Total	n.i.	n.i.	n.i.	n.i.	n.i.	n.i.	n.i.	n.i.	n.i.	n.i.	n.i.	0,24	0,33	0,39	0,60

Annex G – Historical Management Fees

Figure G.1

Management fees (\$ in billions)



Annex H – Funds’ Performance and Size Details

Table H.1

Funds details

The table below shows the list of the funds used in the regression analysis, including the details about the business line, vintage, size (committed capital) and performance (MOIC). The data is stated as of 31.12.2018.

Company	Fund	Business line	Vintage	IPO year	Size (mill \$)	MoIC
Apollo	U.S. RE Fund II	RE	2016	2011	1 233	1,4
Apollo	U.S. RE Fund I	RE	2012	2011	651	1,5
Apollo	AGRE Debt Fund I	RE	2011	2011	2 278	1,1
Apollo	Asia RE Fund	RE	2017	2011	709	1,2
Apollo	Fund VIII	PE	2013	2011	18 377	1,4
Apollo	Fund VII	PE	2008	2011	14 677	2,0
Apollo	Fund VI	PE	2006	2011	10 136	1,7
Apollo	Fund V	PE	2001	2011	3 742	2,5
Apollo	ANRP II	PE	2016	2011	3 454	1,4
Apollo	ANRP I	PE	2012	2011	1 323	1,2
Apollo	AION	PE	2013	2011	826	1,3
Apollo	COF III	Credit	2014	2011	3 426	1,0
Apollo	COF II	Credit	2008	2011	1 583	1,5
Apollo	COF I	Credit	2008	2011	1 485	2,7
Apollo	EPF II	Credit	2012	2011	3 462	1,5
Apollo	EPF I	Credit	2007	2011	1 485	1,7
Apollo	FCI II	Credit	2013	2011	1 555	1,2
Apollo	FCI I	Credit	2012	2011	559	1,4

Apollo	SCRF III	Credit	2015	2011	1 238	1,2
Apollo	SCRF II	Credit	2012	2011	104	1,1
Apollo	SCRF I	Credit	2008	2011	118	1,5
Ares	EF IV	RE	2014	2014	1 302	1,5
Ares	EPEP II	RE	2015	2014	747	1,3
Ares	ACOF I	PE	2003	2014	751	1,8
Ares	ACOF II	PE	2006	2014	2 100	2,0
Ares	ACOF III	PE	2008	2014	3 510	2,5
Ares	ACOF IV	PE	2012	2014	4 700	1,7
Ares	SSF IV	PE	2015	2014	1 515	0,9
Ares	USPF IV	Infra	2010	2014	1 688	1,3
Ares	EIF V	Infra	2015	2014	801	1,1
Ares	ACE II	Credit	2013	2014	1 216	1,4
Ares	ACE III	Credit	2015	2014	2 822	1,3
Blackstone	BREP I	RE	1994	2007	381	2,8
Blackstone	BREP II	RE	1996	2007	1 198	2,1
Blackstone	BREP III	RE	1999	2007	1 523	2,4
Blackstone	BREP IV	RE	2003	2007	2 199	1,6
Blackstone	BREP V	RE	2005	2007	5 539	2,3
Blackstone	BREP VI	RE	2007	2007	11 060	2,5
Blackstone	BREP VII	RE	2011	2007	13 495	1,9
Blackstone	BREP VIII	RE	2015	2007	16 458	1,4
Blackstone	BREP Int'l	RE	2001	2007	1 005	2,1
Blackstone	BREP Int'l II	RE	2005	2007	1 988	1,8
Blackstone	BREP Europe III	RE	2008	2007	3 910	2,1
Blackstone	BREP Europe IV	RE	2013	2007	8 185	1,8
Blackstone	BREP Europe V	RE	2016	2007	9 610	1,3
Blackstone	BREP Asia I	RE	2013	2007	5 096	1,5
Blackstone	BCP I	PE	1987	2007	859	2,6
Blackstone	BCP II	PE	1993	2007	1 361	2,5
Blackstone	BCP III	PE	1997	2007	3 967	2,3
Blackstone	BCOM	PE	2000	2007	2 137	1,4
Blackstone	BCP IV	PE	2002	2007	6 773	2,8
Blackstone	BCP V	PE	2005	2007	21 022	1,9
Blackstone	BCP VI	PE	2011	2007	15 191	1,9
Blackstone	BEP I	PE	2011	2007	2 435	1,8
Blackstone	BEP II	PE	2015	2007	4 930	1,4
Blackstone	BCP VII	PE	2016	2007	18 591	1,4
Blackstone	Strategic Partners VI LBO, RE and SMA	PE	2014	2007	7 402	1,5
Blackstone	Strategic Partners VII	PE	2016	2007	8 222	1,3
Blackstone	Strategic Partners Real Assets II	PE	2017	2007	1 898	1,2
Blackstone	BCEP	PE	2017	2007	4 756	1,2
Blackstone	Mezzanine I	Credit	2007	2007	2 000	1,6
Blackstone	Mezzanine II	Credit	2011	2007	4 120	1,3
Blackstone	Mezzanine III	Credit	2016	2007	6 639	1,1
Blackstone	Stressed / Distressed Investing I	Credit	2009	2007	3 253	1,4
Blackstone	Stressed / Distressed Investing II	Credit	2013	2007	5 125	1,2
Blackstone	Energy Select Opportunities	Credit	2015	2007	2 857	1,2
Blackstone	European Senior Debt Fund	Credit	2015	2007	2 397	1,1
Carlyle	CRP III	RE	2000	2012	564	3,4
Carlyle	CRP IV	RE	2004	2012	950	1,5
Carlyle	CRP V	RE	2006	2012	3 000	1,6
Carlyle	CRP VI	RE	2010	2012	2 340	1,8
Carlyle	CRP VII	RE	2014	2012	4 162	1,5
Carlyle	CEREP I	RE	2002	2012	520	1,4
Carlyle	CEREP II	RE	2005	2012	930	0,2
Carlyle	CEREP III	RE	2007	2012	2 720	1,2
Carlyle	CP II	PE	1995	2012	1 331	3

Carlyle	CP III	PE	2000	2012	3 913	2,5
Carlyle	CP IV	PE	2005	2012	7 850	2,4
Carlyle	CP V	PE	2007	2012	13 720	2,1
Carlyle	CP VI	PE	2014	2012	13 000	1,4
Carlyle	CEP I	PE	1998	2012	1 224	2,2
Carlyle	CEP II	PE	2003	2012	2 203	2
Carlyle	CEP III	PE	2007	2012	6 460	2,3
Carlyle	CEP IV	PE	2014	2012	4 477	1,3
Carlyle	CAP I	PE	1998	2012	750	4
Carlyle	CAP II	PE	2006	2012	1 810	1,9
Carlyle	CAP III	PE	2008	2012	2 552	1,8
Carlyle	CAP IV	PE	2014	2012	3 880	1,3
Carlyle	CJP I	PE	2001	2012	453	2,9
Carlyle	CJP II	PE	2006	2012	1 500	1,5
Carlyle	CGFSP I	PE	2008	2012	1 100	2,3
Carlyle	CGFSP II	PE	2013	2012	1 000	1,5
Carlyle	CEOF I	PE	2011	2012	1 119	1,5
Carlyle	CETP II	PE	2008	2012	636	2,9
Carlyle	CAGP IV	PE	2008	2012	1 041	1,4
Carlyle	CGP	PE	2015	2012	3 588	1,1
Carlyle	CJP III	PE	2013	2012	1 082	2,4
Carlyle	CETP III	PE	2014	2012	801	1,8
Carlyle	CIP	Infra	2006	2012	1 144	1,3
Carlyle	NGP X	Infra	2012	2012	3 586	1,2
Carlyle	NGP XI	Infra	2014	2012	5 325	1,4
Carlyle	Energy III	Infra	2005	2012	3 800	1,6
Carlyle	Energy IV	Infra	2007	2012	5 979	1,3
Carlyle	Renew II	Infra	2008	2012	3 418	1,5
Carlyle	CIEP I	Infra	2013	2012	2 500	1,5
Carlyle	CPP II	Infra	2014	2012	1 527	1,2
Carlyle	CSP II	Credit	2007	2012	1 352	1,8
Carlyle	CSP III	Credit	2011	2012	703	1,7
Carlyle	CEMOF I	Credit	2011	2012	1 383	0,9
KKR	Real Estate Partners Americas	RE	2013	2010	1 229	1,5
KKR	Real Estate Partners Europe	RE	2015	2010	709	1,2
KKR	1980 Fund	PE	1980	2010	357	5,1
KKR	1982 Fund	PE	1982	2010	328	3,9
KKR	1984 Fund	PE	1984	2010	1 000	6
KKR	1986 Fund	PE	1986	2010	672	13,5
KKR	1987 Fund	PE	1987	2010	6 130	2,4
KKR	1993 Fund	PE	1993	2010	1 946	2,1
KKR	1996 Fund	PE	1996	2010	6 012	2,1
KKR	European Fund	PE	1999	2010	3 085	2,8
KKR	Millennium Fund	PE	2002	2010	6 000	2,4
KKR	European Fund II	PE	2005	2010	5 751	1,5
KKR	2006 Fund	PE	2006	2010	17 642	2
KKR	Asian Fund	PE	2007	2010	3 983	2,2
KKR	European Fund III	PE	2008	2010	5 560	2,1
KKR	E2 Investors (Annex Fund)	PE	2009	2010	196	1
KKR	China Growth Fund	PE	2010	2010	1 010	1,3
KKR	Natural Resources Fund	PE	2010	2010	887	0,3
KKR	North America Fund XI	PE	2012	2010	8 718	1,9
KKR	Asian Fund II	PE	2013	2010	5 825	1,5
KKR	Energy Income and Growth Fund	PE	2013	2010	1 974	1,1
KKR	European Fund IV	PE	2015	2010	3 512	1,5
KKR	Next Generation Technology Growth Fund	PE	2016	2010	659	1,7
KKR	Health Care Strategic Growth Fund	PE	2016	2010	1 331	1,4
KKR	Global Infrastructure Investors	Infra	2011	2010	1 040	1,7

KKR	Global Infrastructure Investors II	Infra	2014	2010	3 040	1,2
KKR	Special Situations Fund	Credit	2012	2010	2 274	1,2
KKR	Special Situations Fund II	Credit	2014	2010	3 476	1,1
KKR	Mezzanine Partners	Credit	2010	2010	1 023	1,5
KKR	Private Credit Opportunities Partners II	Credit	2015	2010	2 245	1
KKR	Lending Partners	Credit	2011	2010	460	1,2
KKR	Lending Partners II	Credit	2014	2010	1 336	1,3
KKR	Lending Partners Europe	Credit	2015	2010	848	1,1
Oaktree	Oaktree Real Estate Opportunities FundVII	RE	2016	2012	2 921	1,4
Oaktree	Oaktree Real Estate Opportunities Fund VI	RE	2012	2012	2 677	1,6
Oaktree	Oaktree Real Estate Opportunities Fund V	RE	2011	2012	1 283	1,9
Oaktree	Special Account D	RE	2009	2012	256	1,8
Oaktree	Oaktree Real Estate Opportunities Fund IV	RE	2007	2012	450	2
Oaktree	Oaktree Real Estate Debt Fund	RE	2013	2012	1 112	1,3
Oaktree	Oaktree PPIP Fund	RE	2009	2012	2 322	1,4
Oaktree	Special Account G (Real Estate Income)	RE	2016	2012	615	1,2
Oaktree	Oaktree European Principal Fund III	PE	2011	2012	3 860	2,1
Oaktree	OCM European Principal Opportunities Fund II	PE	2007	2012	2 146	1,3
Oaktree	OCM European Principal Opportunities Fund	PE	2006	2012	495	2,1
Oaktree	Oaktree Power Opportunities Fund IV	PE	2015	2012	1 106	1,1
Oaktree	Oaktree Power Opportunities Fund III	PE	2010	2012	1 062	2
Oaktree	Oaktree Special Situations Fund	PE	2015	2012	1 377	1,2
Oaktree	Oaktree Principal Fund V	PE	2009	2012	2 827	1,3
Oaktree	Special Account C	PE	2008	2012	505	1,5
Oaktree	OCM Principal Opportunities Fund IV	PE	2006	2012	3 328	2
Oaktree	Highstar Capital IV	Infra	2010	2012	2 000	1,1
Oaktree	Oaktree Opportunities Fund X	Credit	2016	2012	3 603	1,4
Oaktree	Oaktree Opportunities Fund IX	Credit	2014	2012	5 066	1,2
Oaktree	Oaktree Opportunities Fund VIIIb	Credit	2011	2012	2 692	1,5
Oaktree	Special Account B	Credit	2009	2012	1 031	1,6
Oaktree	Oaktree Opportunities Fund VIII	Credit	2009	2012	4 507	1,7
Oaktree	OCM Opportunities Fund VIIb	Credit	2008	2012	10 940	2
Oaktree	OCM Opportunities Fund VII	Credit	2007	2012	3 598	1,5
Oaktree	Oaktree European Capital Solutions Fund	Credit	2015	2012	858	1,1
Oaktree	Oaktree European Dislocation Fund	Credit	2013	2012	359	1,3
Oaktree	Special Account E	Credit	2013	2012	462	1,3
Oaktree	Oaktree Mezzanine Fund IV	Credit	2014	2012	852	1,2
Oaktree	Oaktree Mezzanine Fund III	Credit	2009	2012	1 592	1,4
Oaktree	OCM Mezzanine Fund II	Credit	2005	2012	1 251	1,6
Oaktree	OCM Mezzanine Fund	Credit	2001	2012	808	1,5
Oaktree	Oaktree Emerging Market Opportunities Fund	Credit	2013	2012	384	1,5
Oaktree	Special Account F	Credit	2014	2012	253	1,3

Annex I – Fund Size Benchmarks

Table I.1

Fund size benchmarks

The table below shows the average fund size for the global private equity market, as well as the average fund size for the group of private peers. The numbers are stated in \$mln.

Vintage Year	Market Average	Private Group Average
1980	n.a.	101,00
1984	n.a.	37,00
1986	n.a.	1175,00
1987	n.a.	165,50
1993	n.a.	357,50
1995	n.a.	400,00
1996	148,33	309,25
1997	198,30	1101,44
1998	261,61	1406,67
1999	263,16	227,80
2000	274,17	1954,41
2001	223,88	1157,94
2002	196,04	259,26
2003	173,52	2053,86
2004	218,85	1093,47
2005	314,72	2698,17
2006	376,87	3903,96
2007	396,17	2831,74
2008	385,05	6250,86
2009	278,43	n.a.
2010	202,96	430,60
2011	220,92	1595,72
2012	232,60	3345,98
2013	293,95	1211,88
2014	298,92	3831,75
2015	289,56	6464,50
2016	333,07	4464,04
2017	491,86	2553,40

Annex J – List of OMX IPOs in 2019

Table J.1

List of OMX IPOs in 2019

The table below shows the full list of companies that went public on Nasdaq Stockholm in 2019. The prices are stated in SEK.

	Ticker	Offer Price	First-day Closing Price	Initial Return	# of Shares Offered	First-day Volume	IPO Turnover
Kollect on Demand Holding AB	KOLL	14	14	0,00	1 312 944	74 775	0,06
QleanAir Holding AB	QAIR	40	39,5	-0,01	7 500 000	1 810 000	0,24
M.O.B.A. Network AB	MOBA	176,5	124,2	-0,30	145 000	22 382	0,15
24Storage AB	24STOR	47	53,1	0,13	2 128 000	176 280	0,08
K-Fast Holding AB	KFAST B	105	163	0,55	7 500 000	1 111 111	0,15
Transcendent Group AB	TRG	31	27,6	-0,11	1 612 904	78 990	0,05
ZignSec AB	ZIGN	5,3	5,65	0,07	6 650 000	6 240 000	0,94
EQT AB	EQT	67	90	0,34	190 596 780	49 017 820	0,26
EWPG Holding AB	EWP	19	15,9	-0,16	6 410 094	373 189	0,06
Inzile AB	INZILE	9,55	10	0,05	4 725 000	876 913	0,19
Mentice AB	MNTC	49	67,6	0,38	8 420 751	979 181	0,12
John Mattson Fastighetsföretagen AB	JOMA	90	138,4	0,54	14 500 000	1 980 000	0,14
Vertiseit AB	VERT B	15,3	16,9	0,10	4 516 340	289 296	0,06
OssDsign AB	OSSD	27,5	23	-0,16	5 500 000	1 240 000	0,23
Upsales Technology AB	UPSALE	22	29,18	0,33	1 140 000	651 531	0,57
Karnov Group AB	KAR	43	44,3	0,03	60 513 473	6 360 000	0,11
Triboron International AB	TRIBO B	8,8	19,1	1,17	3 448 864	7 550 000	2,19
Teqnion AB	TEQ	26	39	0,50	3 076 923	566 830	0,18
Frill Holding AB	FRILL B	5	4,58	-0,08	4 000 000	640 761	0,16
Ferroamp Elektronik AB	FERRO	16	18,8	0,18	2 500 000	451 540	0,18
Ascelia Pharma AB	ACE	25	24,88	0,00	8 000 000	771 688	0,10
InCoax Networks AB	INCOAX	20	9,5	-0,53	766 066	286 969	0,37

Annex K – Trading Volumes Before and After C-corp Conversion

Table K.1

Trading volumes before and after C-corp conversion

The table below shows the average and median trading volumes 3 months before and after conversion to C-corp.

Company	Conversion date	Average 3m Daily Volumes		Median 3m Daily Volumes	
		Pre-transition	Post-transition	Pre-transition	Post-transition
Blackstone	01.07.2019	4 914 915	8 092 718	4 127 600	6 093 723
KKR	01.07.2018	3 542 786	6 593 187	2 558 267	4 241 934
Apollo	05.09.2019	1 700 002	2 562 892	1 447 072	2 108 335
Carlyle	01.01.2020	931 992	3 020 150	854 393	2 669 297
Ares	01.03.2018	141 412	527 965	110 594	303 790

Annex L – Dividend Adjusted Share Prices and Trading Volumes

Figure L.1

Blackstone trading volume and dividend adjusted share pricing (USD)

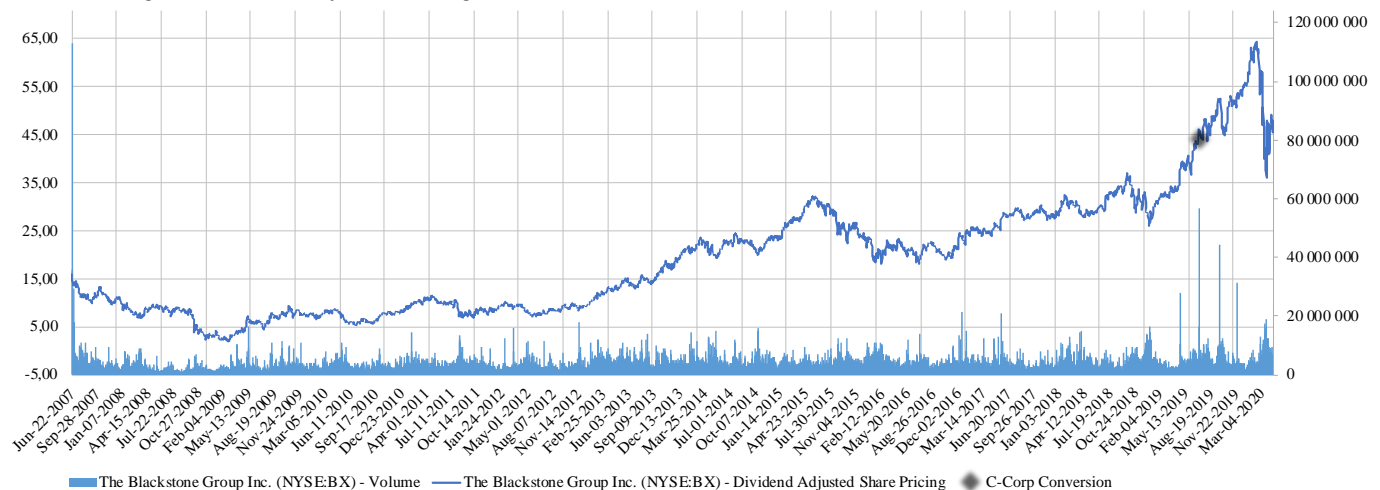


Figure L.2

KKR trading volume and dividend adjusted share pricing (USD)

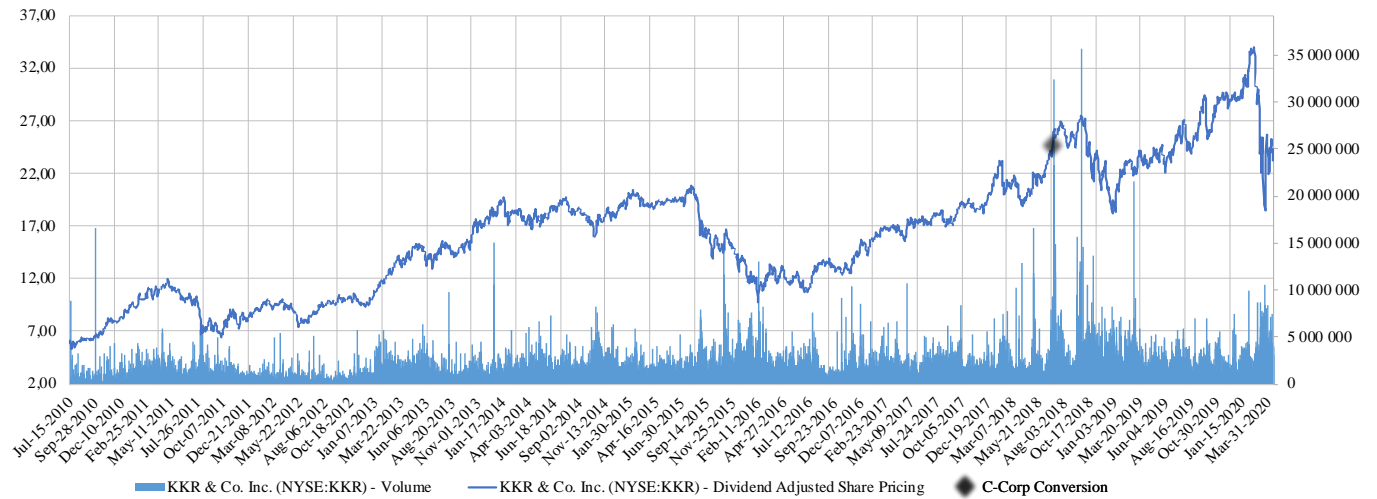


Figure L.3

Apollo trading volume and dividend adjusted share pricing (USD)

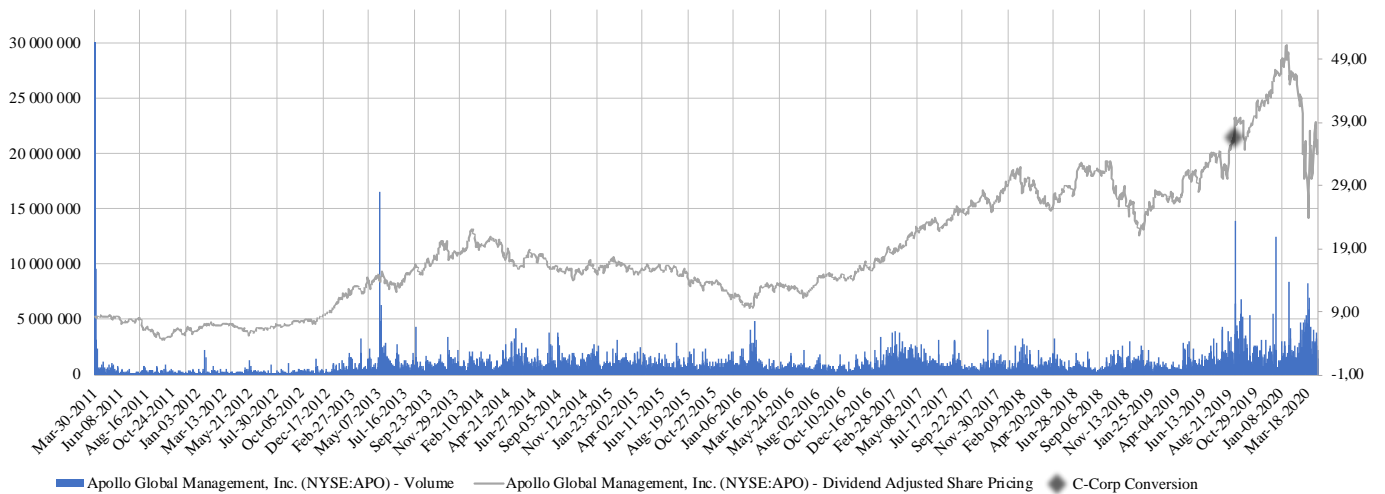


Figure L.4

Oaktree trading volume and dividend adjusted share pricing (USD)

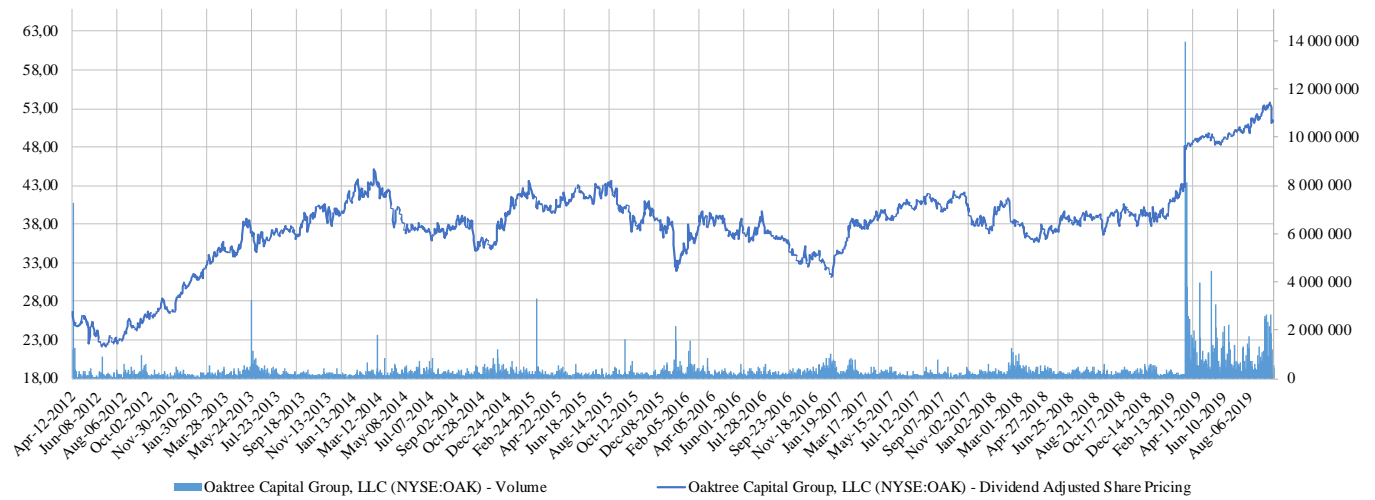


Figure L.5

Carlyle trading volume and dividend adjusted share pricing (USD)

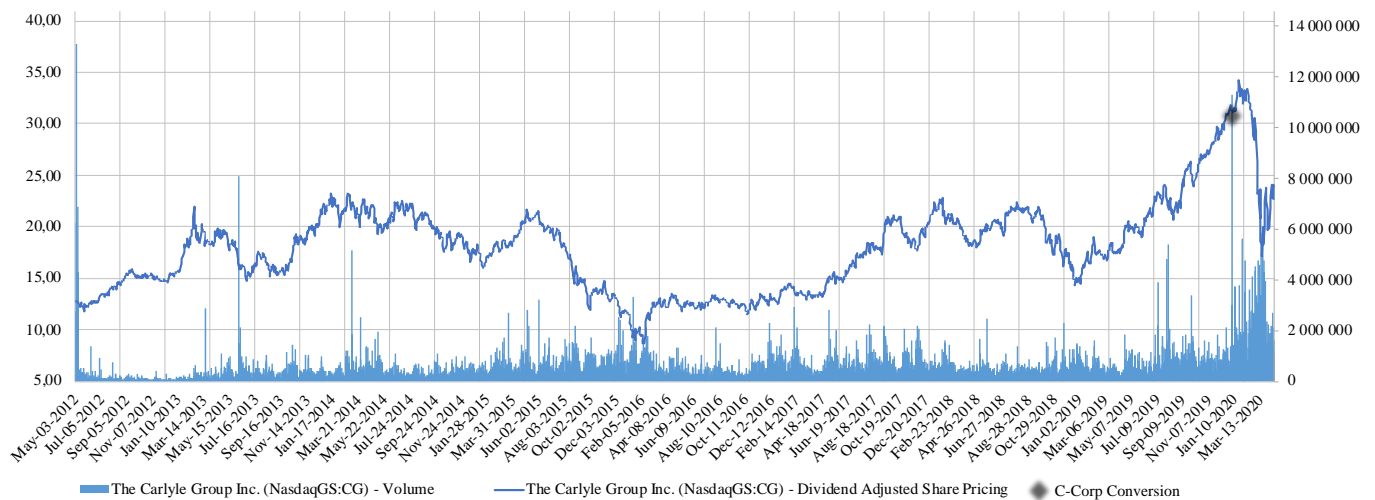


Figure L.6

Ares trading volume and dividend adjusted share pricing (USD)

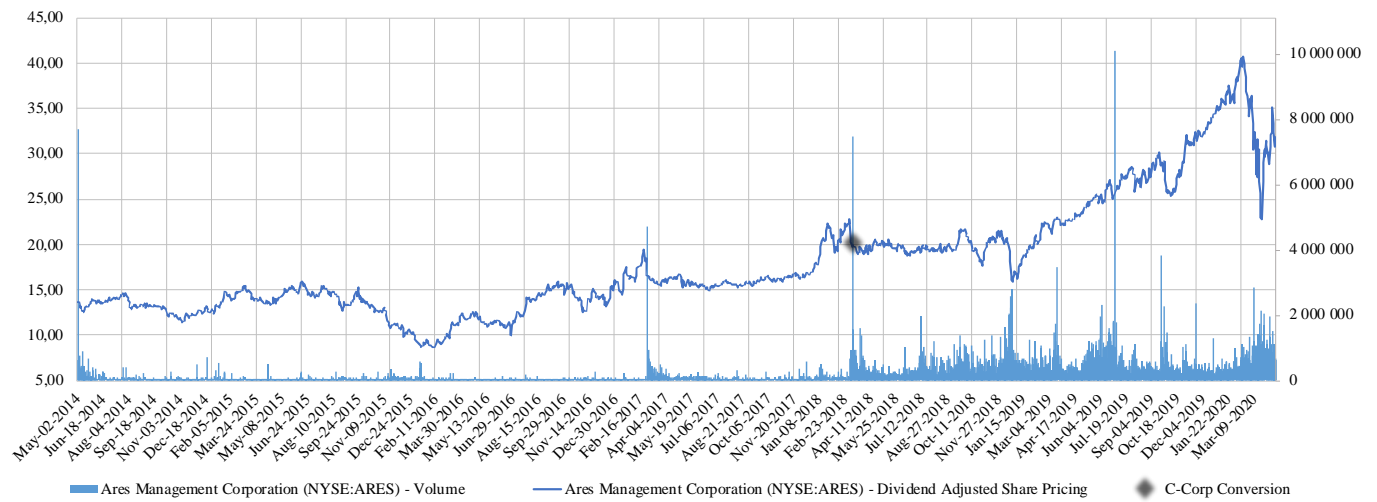
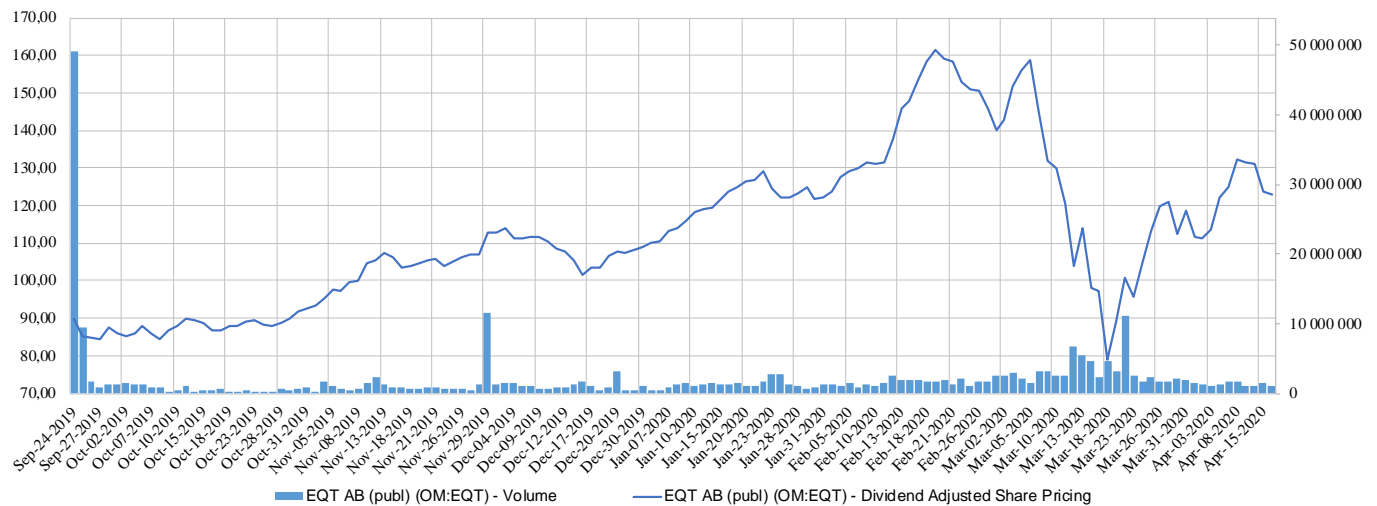


Figure L.7

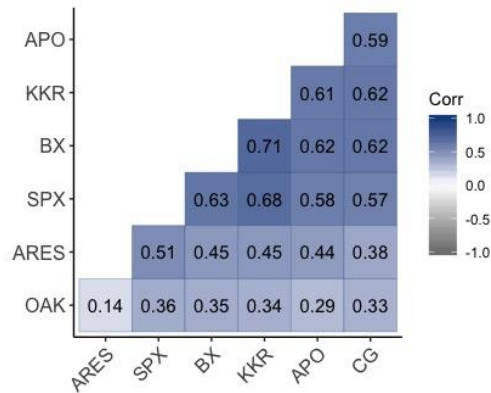
EQT trading volume and dividend adjusted share pricing (USD)



Annex M – Stock Return Correlations

Figure M.1

Correlations between LPE fund managers and S&P 500



Annex N – Stock Performance of the Selected LPE Fund Managers

Figure N.1

Stock performance of the selected LPE fund managers and S&P 500



Annex O – Risk-Return Analysis (excl. COVID-19 effect)

Table O.1

Risk-return analysis of the selected LPE fund managers (excl. COVID-19 effect)

The table below shows the summary of risk-return statistics for six securities and S&P 500 index, that was chosen as a control variable. The researched time period: 22.06.2007 - 31.01.2020

Parameter	Blackstone	KKR	Apollo	Oaktree*	Carlyle	Ares	S&P 500
Annualized Return	11%	19%	22%	9%	13%	18%	6%
Annualized Std Dev	46%	31%	31%	20%	29%	30%	20%
Cumulative Return	276%	413%	465%	94%	151%	161%	115%
Annualized S ratio	0,22	0,58	0,68	0,43	0,40	0,57	0,28

* Oaktree was acquired by Brookfield Asset Management Inc. in 2019, thus stock's data available only up until 27.09.2019

Annex P – GP vs LP betas: T-Test Results

Table P.1

T-test results

The table below shows the results of the t-Test (two-sample assuming unequal variances), performed on two samples: LP betas and GP betas (based on CAPM).

	Variable 1	Variable 2
Mean	0,3126	1,1063
Variance	0,0909	0,0966
Observations	12	6
Hypothesized Mean Difference	0,0000	
df	10	
t Stat	-5,1573	
P(T<=t) one-tail	0,0002	
t Critical one-tail	1,8125	
P(T<=t) two-tail	0,0004	
t Critical two-tail	2,2281	