Permanent capital, permanent struggle? New evidence from listed private equity*

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Abstract

Recent years witnessed a slew of private equity IPOs, commonly dubbed listed private equity (LPE). While the terminology is oxymoronic, we document aspects of the still-private nature of LPE and study the important question of their performance. Many data providers built on LPE to proxy for traditional (unlisted) private equity (TPE). While index providers use selected LPEs, we build a representative dataset of the LPE universe and compare their performance to TPE. We also examine whether belonging to indices and having minimum liquidity requirements is linked to performance. Our results suggest that listing decreases performance by 4.9% to 5.8% on average. Within LPE, performance is highly related to the organizational forms of the listed entities and is not individually related to liquidity, trading in the home country exchange or with being part of a LPE index. However, the combination of the three decreases alpha by 5% and suppresses its significance.

Keywords: private equity, listed private equity, performance, IPO.

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1. Introduction

In 2006, private equity firm Kohlberg, Kravis and Roberts (KKR) took the private equity industry by surprise when it announced its initial public offering. No less than a year later, another private equity mastodon, Blackstone, completed its initial public offering on New York Stock Exchange. While these listings brought attention to listed private equity, this is far from being a recent trend. Previous years have witnessed such listing, especially in Europe, with the initial public offering of UK-based 3i Group in 1994, SVG Capital in 1996, or long before that with Canadian-based Onex in 1987.

The opaque nature of traditional (unlisted) private equity and the growing need for reliable and transparent performance metrics drove financial providers to build on listed private equity in order to proxy for traditional private equity performance. Illustrations of index products offered to investors include Thomson Reuters listed private equity index (launched in 2008) [1], Dow Jones Stoxx private equity 20 (started in 2007), or mutual fund's ALPS-Red Rocks listed private equity index. Investors use these indices to earn the diversifications benefits known to private equity[2] alongside other asset classes, such as hedge funds and real estate investment trusts (REITs). But does listed private equity perform as traditional private equity? Why do we observe such listings? Most importantly, is listing a driver or a result of observed performances? And do listed private equity indices reflect the performance of the whole asset class?

Our paper sheds light on the mechanisms by which private equity becomes publicly traded and addresses each of these important questions. In particular, listed private equity has the advantage of providing readily available market data, which is an interesting feature compared to traditional private equity, where data is often an issue for academic research. Moreover, listing provides an effective liquidity measure for private equity.

Surprisingly, the universe of listed private equity is not easily identifiable. Our effort is also towards mitigating selection bias from simply studying index constituents. To this end, we use textual analysis in the universe of listed companies across different databases and we are able to

[1] See "S&P index to track top 25 private equity firms", the Financial Times, March 12th, 2007.

[2] Franzoni, Nowak and Phalippou (2012) argue whether traditional (unlisted) private equity truly provides diversification benefits and find that it suffers from the same exposure to liquidity risk as public equity and other asset classes.

identify 560 listed private equity entities. This far exceeds the number of studied entities in the growing literature on listed private equity and approximates the estimated universe of listed private equity by industry professionals. Because we intend to study performance differentials between traditional private equity and listed private equity, we rely on common performance measures. We engage in collecting data on the identified sample from several data providers and carefully gauge their accuracy. Several private equity studies pointed out biases in databases used for private equity research. We review the work on vendor databases' accuracy and carefully mitigate the possible biases by testing for the accuracy of the reported data and by using a less likely biased measure for performance.

Listed private equity come in different flavors as there is no special existing framework that specifies their listing[3]. We account for this heterogeneity in constructing our performance dataset as they may carry specific fee structures and tax-optimization effects. Our performance dataset is comprised of firm-level data on 34,470 portfolio companies, invested by 9,622 private equity firms, funds, or funds-of-funds between 1965 and 2010. We are able to match 206 listed private equity entities from our identified universe of listed private equity, that is 36% of the population of listed private equity and far exceeds the documented numbers of index constituents and the ratio of the studied samples to their population in previous studies.

We overcome the causality between listing and performance by using propensity score matching techniques. Our results suggest that listed private equity significantly underperform traditional private equity by 4.9% to 5.8% and this result is robust to different matching procedures. We look for drivers of such underperformance by investigating possible explanations within the listed private equity subsample. We study the effects of liquidity, of being an index constituent and of being traded on the local market on performance of LPE. Taken separately, these metrics do not seem to individually impact performance. However, interactions between the three decrease the alpha of LPE by 5% and completely suppress its significance. We further note that the type of the organizational structure significantly influences LPE performance. Increasing the complexity of the listing structure provides less exposure to the underlying portfolio companies

[3] In its simplest forms, listed private equity refers to either a listed private equity management firm, a listed fund-of-funds or a listed fund. Other structures include investment trusts, Special Purpose Acquisition Companies (SPACs), Structured Trust Acquisition Companies (STACs) and other hybrid forms. See Appendix 1 for an overview.

and significantly increases performance by 3%. This figure is consistent with what private equity investors require as a minimum return in excess of the stock market to compensate for the risks associated with investing in private equity portfolio companies, known to be illiquid and more exposed to risks of bankruptcy or financial distress.

Literature on private equity performance is an active research field and results on performance vary widely across time periods and data sources. Recent research still debates previously documented private equity outperformance compared to the public market. Harris, Jencksinson and Kaplan (2014) report that private equity outperforms the market by 3% on average annually, using Burgiss data across vintage years 1984-2008 and with comparison to the S&P500 as the public benchmark. With preqin data between vintages 1993 and 2011, Phalippou (2014) documents a -3.1% annual underperformance after adjusting for size, value and leverage, using the Fama French small, value, 1.3x leveraged index, which is closer in nature to characteristics of the companies private equity invest in. The body of literature on listed private equity is in its earliest steps as the only published paper, Jegadeesh et al. (2015), tried the mitigate the highlighted controversy on private equity performance from an asset pricing perspective, by carrying an ex-ante analysis of the market's expectations of private equity returns, instead of the traditional ex-post studies on private equity performance.

Our contribution adds up to these growing efforts and explores private equity performance in a new way. We provide better coverage of the universe of listed private equity and do not simply rely on index constituents like previous LPE studies. There is an extensive body of literature examining whether indices replicate the performance of their underlying assets, such as studies on hedge fund indices or REITs indices, but the question of whether a listed private equity index is related to the performance of the underlying private equity investments has not been examined, especially that we observe more frequent pricing of LPE compared to traditional private equity. This is important for both the academic field and the investor who seeks exposure to private equity through LPE.

The rest of the paper proceeds as follows. Section 2 describes the particularities and features of listed private equity and reviews previous research on private equity data. Data and methodology are given in section 3. In section 4, we examine the relationship between private equity performance and listing, and study performance drivers within the LPE subsample with regards to liquidity, being part of an index and other related factors. Section 5 concludes.

2. Listed private equity and private equity performance

In this section, we discuss the different listing forms of private equity and briefly review the literature on private equity performance. In traditional private equity, institutional understanding is important to carry out private equity research. Listed private equity is not a homogenous universe and understanding their structures is therefore crucial to identifying these entities and better approach questions about their performance.

2.1. Listed private equity

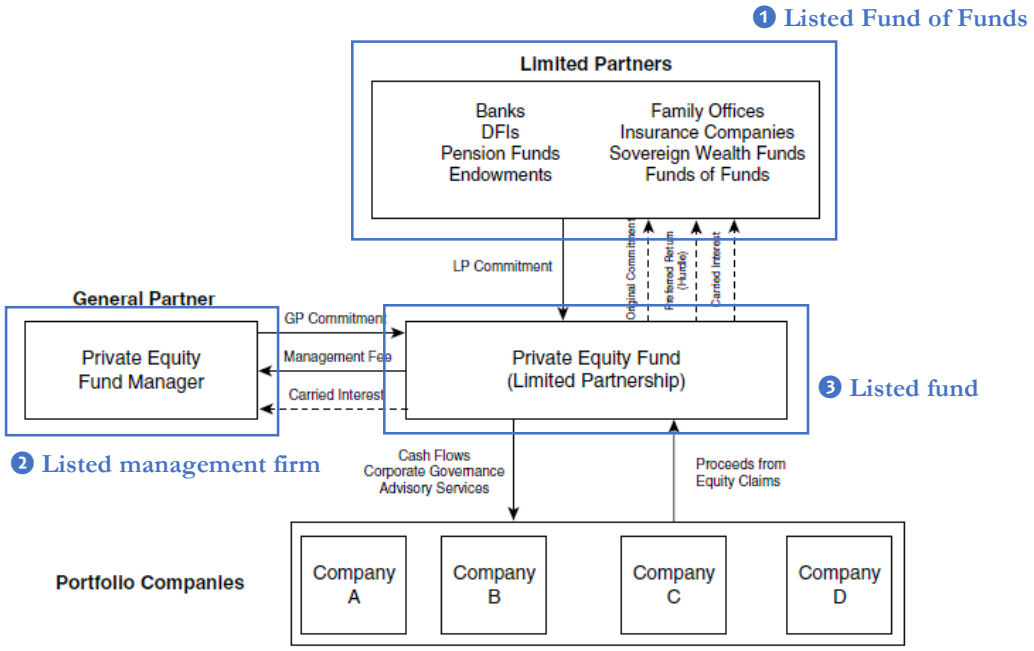
Private equity is a long-term investment in privately held companies, aimed to provide equity or equity-like financing in order to help develop these companies and generate attractive long-term returns to their investors. Private equity investments are usually organized in limited liability partnerships (LLP), where investors, the limited partners (LPs), commit capital to a fund run by a management company, the General Partners (GPs), who are compensated via a management fee (usually 1 to 2% of the committed capital), and a performance fee (carried interest) that is earned if the GPs reach the investors preferred rate of return (hurdle rate, usually 8%). Carried interest usually amounts to 20% of the proceeds when the fund is liquidated. The fund's life is about 10 years, extendable to an additional 2 to 4 years[4].

To that extent, listed private equity may seem as an oxymoron. However, listed private equity is far from being a contradiction in terms. In fact, these entities still invest in privately held companies with the intention to divest following the private equity business model. Yet, we observe a publicly held component to the traditional limited liability partnership structure. Listed private equity first drew attention when some of the industry's big players completed their initial public offerings. Examples include KKR in 2006, Blackstone in 2007, and Carlyle in 2012. There has been a slew of similar public listings in the past decade and the trend seems to continue up to very recently, when the market saw Hamilton Lane's USD 200 million IPO on Nasdaq in February 2017[5], and Draper Esprit's GBP 120 million (~USD 154 million) IPO on London and Dublin Stock Exchanges in June 2016[6].

[4] See Phalippou (2007) for an overview of private equity fund structure and business cycle.
[5] See "Hamilton Lane files for IPO", The Wall Street Journal, February 1st, 2017.
[6] See "Draper Esprit says IPO back on, prepares to ring the bell on Wednesday", The Telegraph.

There are several ways we observe listed private equity. It can refer to the case where the underlying asset is a private equity investment, either managed by a listed GP (listed management firm), sponsored by a listed LP (listed fund of funds) or directly held by a listed fund. Figure 1 illustrates these three possible listing options, and Appendix 1 shows the different generic structures of listed private equity and the kinds of exposures they offer investors.

Figure 1 : Listing options for private equity. In a limited liability partnership (LLP), private equity investors or limited partners (usually pension funds, university endowments, insurance companies, etc.) commit capital to a fund, raised and managed by the general partners. The general partners source, identify, invest in, monitor and exit the portfolio companies over the fund's life (usually 10 years, extendable by mutual agreement to 2 to 4 years if the GPs need more time to exit their investments). The general partners are compensated via a management fee (a percentage of the committed capital, on average 2%), and a performance fee, called carried interest (a percentage of the proceeds from liquidating the fund, usually 20%) which is paid if the managers reach a certain hurdle rate (the investors' preferred rate of return, on average 8%).Listed private equity can either refer to a listed limited partner (1), a listed general partner (2), or a listed fund (3).



Source: adapted from Leeds (2015)

In the following, we would refer to any of the three listing options indifferently as *listed private equity* (or *LPE*). In our analysis, we would emphasise on the different structures accordingly. We also use the terminology traditional private equity, or TPE indifferently to designate non-listed private equity funds or firms. Emphasis on listing structures is justified by the purpose of our research and will drive some of our methodology choices discussed in the next section.

2.2. Private equity performance

In this section, we review the related literature on private equity performance and recent research in listed private equity, before building the ground for our contribution.

Private equity performance literature spans many research questions and results differ across time periods and the data used. The body of literature can be divided into two sets: research examining private equity performance gross of fees (at the firm-level), and research examining private equity performance net of fees (at the fund-level). Because of data challenges, the first set tends to be more extensive than the second set. Table 1 reviews some of the pioneering work on private equity performance[7].

The existing literature on private equity performance analyses performance ex-ante and establishes a link between past performance and future performance based on past observation. Jegadeesh et al. (2015) is the first published paper using listed private equity data to do ex-post analysis of private equity performance. Using a sample of 29 listed funds-of-funds and a subsample of 115 direct listed private equity vehicles, they find that the market expects the investors of listed private equity to earn an abnormal return of 0.5% per annum and that returns of listed private equity are a good predictor of changes in reported net asset values of traditional private equity.

[7] See Gilligan and Wright (2014) for a full overview on private equity literature.

Table 1 : Selected literature on private equity performance.

Study	Sample size	Time period	Performance measures	Main findings
Panel A: At the fund level				
Robinson and Sensoy (2016)	Data on 837 funds from one large LP	1984-2008	PME and tailored PME[11]	Private equity performance is cyclical. Funds raised in boom times underperform funds rai in bad times. Fund investors earn a liquidity premium in bad times.
Harris, Jenckinson and Kaplan (2015)	781 US buyouts invested by 300 LPs + 300 European buyouts	1984-2010	PME	Private equity funds outperform the S&P500 and is persistent in time. However, private eq performance is declining: net outperformance before 2006, but performance became rough equal to that of the S&P500 from 2006 onward.
Harris, Jenckinson and Kaplan (2014)	1,400 US buyouts and VC funds invested by 200 LPs	1984-2008	PME	
Phalippou and Gottschalg (2009)	1,345 funds	1980-1993	Profitability Index (PI), Adjusted IRR, and Portion of investments that are successfully exited through an IPO or a sale to another company	Private equity's superior performance documented in previous studies drops to -3.83% per annum compared to the S&P500 after correcting for data bias.
Kaplan and Schoar (2005)	1,841 funds	1980-1997	IRR and PME	Returns net-of-fees to private equity investors are equal to the S&P500. Performance is persistent in time and is cyclical, with top performing funds being less sensitive to cyclicalit effects.
Panel B: At the firm level				
Braun, Jenckinson and Stoff (2017)	Data derived from three large fund-of-fund managers: 13,523 portfolio company investments by 865 buyout funds	1974-2010	GPME[12]	Performance of private equity persistence has significantly declined as the industry has matured and competition grew for interesting deals.
L'Her, Stoyanova, Shaw, Scott, and Lai (2016)	Company data invested by 906 US buyout funds	1986-2014	Tailored PME	Private equity performance is consistent with previous literature findings using the PME, b private equity funds fail to outperform the market using tailored PME.
Kaplan and Stromberg (2009)	17,171 worldwide leveraged buyout transactions	1985-2007	Vintage year return, and annual capital commitment to U.S. private equity funds as a fraction of the U.S. stock market	Private equity fund returns tend to decline with increasing capital commitments, and capita commitments decline when realized returns decline
Hochberg, Ljungqvist and Lu (2007)	3,469 VC funds managed by 1,974 VC firms, involving 16,315 portfolio companies	1980-1999	Portion of investments that are successfully exited through an IPO or a sale to another company	Better-networked VC firms have better performance, and portfolio companies of better-networked VCs are significantly more likely to survive after the exit.

[11] Kaplan and Schoar's (2005) Public Market Equivalent. It compares the return on the invested capital for private equity to what the investors would have earned for the same invested amount in the S&P500. Tailored PME is calculated the same way as the PME but using other public benchmarks than the S&P500. Tailored PME compares private equity performance to that of other developed market indices of publicly-traded companies which are similar to those invested by private equity funds.

[12] Generalized PME, Korteweg and Nagel (2016)

Listed private equity often cite substantial benefits to their IPOs[13]. First, access to permanent capital would allow better investment and exit flexibilities, hence increasing performance. LPE argue that listing provides GPs with readily-available funds to invest from, with indefinitely re-investable capital gains. Listing is also associated with longer investment horizons flexibility that would bring the investee companies to their maximum potential as it lifts the pressure of having to exit investments at the end of the fund's life. Second, the liquidity benefits associated with LPE would exempt investors from the 10-year lock-up periods associated with traditional private equity partnerships and standardize access to this asset class as there is no conditional minimum required capital amount for commitments, which range from thousands to many million dollars in TPE.

Examination of literature gradually builds up an opening for our contribution. Our attention is brought to the least documented field of the developed market of listed private equity, and more specifically to the extent their choice to list is beneficial to their post-IPO performance compared to their pre-IPO private status. Our effort is especially towards providing better coverage of the LPE universe, and examining performance outside the setting of a given index and an asset pricing perspective, and more from under a private equity perspective. The objective of our paper is two-fold. First, we challenge the outperformance claims of listed private equity by comparing their performance to traditional private equity. Second, we attempt to identify the true drivers behind private equity listing and adjudicate on the rationale of such decision.

[13] See Draper Esprit's IPO statement for an illustrative example.

3. Data and methodology

This section describes our data gathering efforts and provides an overview of our methodology. Surprisingly, listed private equity is not easily identified. Because of the different listing structures highlighted in the previous section, LPE is not a homogenous universe. Therefore, traditional screening methods such as industry codes or peer groups are not useful[14]. While some professionals estimate LPE universe to some 200-300 entities[15], one of the largest LPE-index providers estimate the universe of LPE to about 500 vehicles worldwide[16]. Some private equity players, data providers and investment professionals have constructed indices which track the performance of renowned listed private equity[17]. However, to avoid selection bias from simply taking LPE that are index constituents, we use textual analysis[18] in the universe of Orbis – Bureau Van Dijk database (one of the largest datasets of public and private companies), and ThomsonOne Banker, which spans the largest history in private equity data. The use of both databases is an effort to mitigate survivorship bias as both keep records of dead entities[19]. Our approach consists of pooling companies with private equity-specific terminology in their business description. To avoid missing companies whose business description might not best or no longer reflects their operations, we extend our textual analysis to other fields such as the company's overview and history. This returns 21,215 hits in Orbis and 59,991 hits in ThomsonOne Banker. To account for listed entities alone, we filter companies whose status is "listed" or "delisted" in Orbis, and limit the sample to entities with a "public" flag on ThomsonOne. Because Orbis sometimes misclassifies as "unlisted" the companies which are no longer traded, we cross-check the "unlisted" status with other fields and identifiers such as the ticker, ISIN, stock exchange and IPO flag. This restricts the sample to 475 hits in Orbis. ThomsonOne returns 706 hits. We then look into each company's official information (offering

[14] See appendix 3 for an example using listed private equity which are constituents of the LPX index.
[15] For example, Barwon Investment Partners (Australia-based private equity firm) estimates LPE universe to 300 entities. See https://barwon.net.au/private-equity/listed-private-equity-investment-universe/ (visited on April 28th, 2017)
[16] ALPS-Red Rocks. See: http://www.alpsfunds.com/overview/alps-red-rocks-listed-private-equity-portfolio (visited on April 28th, 2017)
[17] See appendix 2 for a summary of existing LPE indices.
[18] Code and dictionaries available upon request.
[19] This allows us to identify 128 dead listed private equity entities that we include in our screened sample, 40 of which are buyouts and 88 are venture capital investing, possibly highlighting higher default rates among listed VCs.

memoranda, annual reports, official websites) to make sure it is private equity investing by the common understanding of private equity business cycle, and eliminate false positives (i.e. shell companies, companies whose primary business is not private equity or venture capital such as corporate private equity or corporate venture capital[20], companies whose portfolio is less than 50% private companies, holding companies, tax-optimization structures and SPACs in their early years[21]). This returns 273 hits in Orbis, and 402 in ThomsonOne. Orbis and ThomsonOne share 108 common values, which brings the sample size to 567 unique values. This much approximates the universe of listed private equity as estimated by the industry professionals, and eliminates selection bias from simply relying on existing index constituents[22]. We are able to match most of these entities by name and market identifiers in the universe of listed companies on Datastream. We also consider to be the IPO date, the day in which we observe actual first trading in Datastream and the delisting date the date in which Datastream returns substrings like {dead}, {delisted} or {merged}[23].

In order to allow for comparison with traditional private equity, we rely on the same performance measures and metrics used in traditional private equity research, with the adjustments discussed in the previous section. Although listed private equity are publicly traded, their investments stay private. Therefore, these entities do not usually disclose performance data as per private equity industry standards. Historically, private equity was not very regulated since most investors were high net worth individuals who could sustain important losses in the case of investment failures. But since the industry professionalized in the 1940's and with growing public institutional investors taking interest in private equity (especially pension funds), the regulatory framework became stiffer, especially with the Freedom of Information Act (FOIA) lawsuits. Initially, private

[20] Corporate private equity (CPE) or Corporate Venture Capital (CVC) is equity investing by established corporations such as Google, Microsoft, IBM, etc. who invest funds through a dedicated PE or VC arm aside from their primary business lines.

[21] Because of reasons highlighted in appendix 2.

[22] Our screened sample contains all LPE index constituents that we were able to identify, namely Listed Private Equity Index (provided by Switzerland-based LPX GmbH), DJ STOXX PE 20 (Dow Jones), Thomson Reuters Buyout Index and Société Générale Privex index. Other products offer private equity exposure to investors via listed vehicles, such as mutual funds ALPS-Red Rocks Listed Private Equity and Vista Listed Private Equity Plus. These mutual funds invest in a diversified portfolio of listed private equity entities and we were able to match their holdings by name to our screened sample.

[23] The use of Datastream is justified by the fact that the sample is international. Because of potential biases highlighted in Ince and Porter (2006), we check the accuracy of the IPO dates across Stock Exchanges in which entities are traded. For delisted entities or entities for which the IPO date is not reported in descriptive data, we check the company news either on Factiva or on their official websites.

equity managers have no obligation to publicly report information on their performance and they only choose to share data with their investors as part of their business relationships. Public reporting became problematic only when public investors such as pension funds became interested in private equity investing, and many court rulings have granted the private equity industry the privacy of sensitive information[24]. Such privacy extends to the case of initial public offerings. Therefore, private equity firms only report aggregated data to the public under FOIA requirements and typical financial information as part of their listed status. Private equity entities also get to choose under which form they become publicly traded, with some forms having interesting features than others[25].

Because of the diversity of the listing forms, we rely on data at the firm level to measure performance in order to control for these possible organizational effects. We source performance data on the identified LPE entities mainly from Pitchbook. Previous literature has pointed out biases in vendor and proprietary datasets used for private equity research. The key rebuke is that most of these commercial databases gather data from GPs rather than from LPs[26], - and in some cases a combination from the two-, hence increasing the selection and survivorship biases. Indeed, one might argue that only the best performing managers would report to these databases, and that the data contains only the successful investment outcomes. Several private equity studies assessed the scope of such biases.

Kaplan, Strömberg and Sensoy (2002) evaluate VentureOne and Venture Economics from comparing the actual contracts of 143 financings to their reported data in the databases and find that they exclude roughly 15% of the financing rounds. Jeng and Lerner (2011) review and comment the exiting data for private equity research and provide alternative data sources. Stücke (2011) assesses the data in Thomson Reuter's VenturExpert[27] and finds that it suffers from a significant downward bias in presented performances. Harris, Jenckinson and Kaplan (2014) study private equity performance using different databases (Burgiss, Preqin, Cambridge

[24] For an illustrative example, see "Freedom of Information Act Clarification for Private Equity, Portfolio Company Information", Illinois Venture Capital Association, 2006.
[25] A brief overview is provided in appendix 1.
[26] Disclosure from LPs is mainly a consequence of the Freedom Of Information Act (FOIA), to which public investors, such as pension funds, are subject to. Other LP sourced data in other jurisdictions uses FOIA-like requirements. LP sourced data is -a priori- of better quality because, unlike GPs, limited partners would not be inclined to overstate returns.
[27] Became Venture Economics. The data has been discontinued since and Thomson Reuters now give access to Cambridge Associates performance data through their platforms.

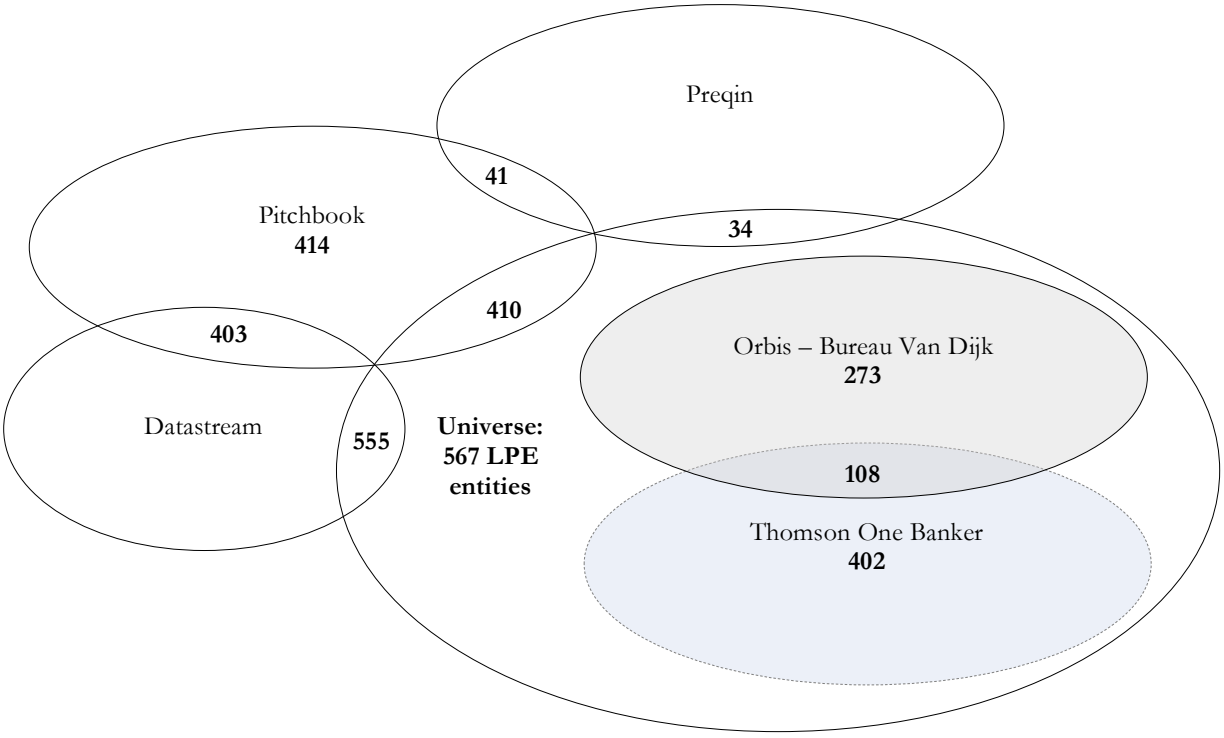
Associates (CA) and Venture Economics (VE)) and find that performance is similar across Burgiss, Preqin and CA, but reach similar conclusions in Stücke (2011) about VE.

Recent initiatives such as the Private Capital Research Institute (Jeng and Lerner (2011), Kaplan and Lerner (2016)), and Burgiss' *Private i* illustrate growing efforts to mitigate biases in previously used databases and provide researchers with better quality data. However, data is anonymized. A trade-off we had to make is to rely on other vendor databases because we needed the identity of the listed private equity entities to allow for merging with other datasets and also to establish a link with the portfolio companies in order to construct our performance dataset. The datasets we use are not of lesser quality and it has been assessed in recent research.

We limit our use of ThomsonOne Banker to screening purposes, and we match the identified entities to Pitchbook for performance data. In their recent study, Harris, Jenkinson and Kaplan (2014) show using Burgiss (LP reported data), that GP-reported data in Preqin and Cambridge Associates is similar to what they find in Burgiss data. They conclude that given the different sourcing methodologies of the studied providers, it would be unlikely that GPs overstate reported returns. We rely on cash-flow data from Preqin to assess the quality of GP-reported data in Pitchbook. To this end, we match listed private equity entities from Pitchbook by name to Preqin. Then, we construct a series of IRR based on Preqin cash-flow data using Pitchbook methodology. We conduct a t-test for IRR differences in both databases, and find an insignificant t-statistic of 1.05, hence asserting the reliability of GP-reported performance data in Pitchbook. The reason we do not fully rely on Preqin data for our study is because of coverage limitations. Preqin has a record of 75 LPE which we were able to identify, compared to 414 in Pitchbook. Moreover, Pitchbook seemed more convenient for the purposes of our research as it is more performance-focused (Kaplan and Lerner, 2016)[28]. Indeed, Pitchbook has a record of an overall 30,199 funds, of which 7,963 with returns data. Preqin, on the other hand, covers 16,923 funds, of which 3,471 with cash-flow data.

[28] The authors give an overview of data available for private equity and venture capital research and assess their quality and potential biases. They highlight the fact that Pitchbook has better coverage on performance data: *"There are currently three major providers of data on VC (and private equity) performance – Burgiss Private I, Cambridge Associates (CA) and Preqin. Pitchbook is a fourth newer entrant with more of a focus on private equity performance"*.

Figure 2 : identifying listed private equity. This figure summarises the identification process of listed private equity using different datasets. The numbers in bold below databases' names correspond to the identified LPE sample in each dataset's universe. Each intersection number highlights the common observations to two or more datasets.



Our base sample consists of an overall 567 listed private equity entities (i.e. listed managers, listed funds and listed funds-of-funds combined). We construct a performance dataset by identifying companies which received investment from a listed LP, a listed GP or a listed private equity fund[29]. Because of differences in the organizational structures of listed private equity and the different legal frameworks they are subject to, it seemed relevant to analyse performance at the firm level instead of the fund level, in order to get around possible legal and organizational effects on performance. To this end, we construct a performance dataset spanning the period 1965-2010[30]. Although we identify listings dating back to 1946, we restrict the sample to this period because of the slow number of observations prior to 1965. We collect data on 34,469

[29] We abuse this terminology and use it for other identified LPE which have other organizational structures.
[30] The average fund life being around 10 years, we restrict the history to 2010 to make sure we capture mostly liquidated funds.

investments, invested by 9,621 firms, funds and funds-of-funds. This performance dataset contains investments by both LPE and TPE. We are able to match investment data to 206 LPE entities (36% of the LPE universe[31]). We also hand collect data from annual reports, company filings and institutional authorities for missing descriptive data and corporate events. Because of the large time span, we track name changes and M&A activities. We consider investment data in the case of a name change under the previous name, and adjust the investment data for the other corporate events (mergers, takeovers, liquidation, delistings, etc.). For instance, if we observe a merger or a takeover between two LPEs A and B at time T, we keep the investment data under A and B's names up to T, and consider investments under the new entity's name (A+B) from T onward. We have account of 1 merger and 13 takeovers over the period 1965-2010.

Figure 2 shows LPE coverage across the different used datasets. Table 2 shows summary statistics of our control variables for the TPE subsample (Panel A) and LPE subsample (Panel B).

Our performance measure is the ratio of successful exits to the number of total exits. We define successful exits as the number of exits by way of either an IPO or M&A. We choose this measure for several reasons. As highlighted before, LPE differ largely in the cross-section because of organizational structures, and taking an investment level measure addresses the problem of having organizational structure effects. This measure also gives an assessment of performance which is not subject to possible reporting biases, unlike, for example, deal multiples. Finally, this measure allows for comparison between different possible compensation schemes. Our control variables include size (AUM), experience (total number of investments), median time to exit (in years), affiliation (to an organized PE association, proxy for networking advantages), the organizational structures (firms, funds, funds-of-funds, and other) and status (defunct, inactive, active). We add specific LPE control variables: a liquidity measure, a dummy for whether the listed entity trades in its home exchange, and a dummy for whether it is a constituent of a LPE index.

[31] In traditional private equity, the relative coverage ratio is 26% in Pitchbook and 20% in Preqin of funds with returns data in their universe of private equity funds. Jegadeesh et al. (2015) use a base sample of 29 listed funds-of-funds and another subsample of 115 listed vehicles. LPE Index providers count 20 to 118 constituents. Our coverage is therefore higher.

Table 2 : Summary statistics. Performance is the ratio of successful exits to total number of exits. AUM are total assets under management in 2010 euros. Affiliation is a dummy for whether the entity is a member of an industry organisation. Total number of deals is the total private equity deals up to 2010, Median time to exit is the median time in years that every entity takes between the investment date and the exit date across its set of investments, Status is a category variable which takes the value of 0 if the entity is defunct, 1 if the entity is inactive, 2 if the entity is moderately active, 3 if it is ceasing investment to develop the existing portfolio and 4 if it is actively seeking new investments. Organizational structure is a category variable which takes the value of 1 if it is fund-of-funds, 2 if it is a management firm, 3 if it is a fund and 0 otherwise.

	Performance	AUM (EUR Mil.)	Affiliation	Total number of deals	Median time to exit (years)	Status	Organizational structure
Panel A: Traditional Private Equity							
Nb. Obs.	9,020	9,020	4,991	9,020	8,830	9,016	9,020
Mean	0.4293	713.39	0.2211	48.00	5.44	3.07	2.00
SD	0.2752	3117.40	0.4150	152.24	2.68	1.54	1.36
Min.	0	0.0675808	0	1	0.05	0	0
25th p.	0.2222	27.30884	0	4	3.6	1	0
Median	0.3843	99.30487	0	13	5.2	4	3
75th p.	0.5441	359.2	0	38	6.85	4	3
Max.	1	177,529.55	1	6,365	16.80	4	3
Panel B: Listed Private Equity							
Nb. Obs.	206	147	206	206	202	206	206
Mean	0.3207	3,238.40	0.4854	89.14	5.50	3.41	2.29
SD	0.1997	12,150.35	0.5010	215.14	2.31	1.31	1.17
Min.	0	0.8179	0	1	0.3	0	0
25th p.	0.1956	29.94	0	11	3.9	4	2
Median	0.2857	113.49	0	31	5.4	4	3
75th p.	0.3928	630.00	1	84	6.85	4	3
Max.	1	187,807.58	1	2,514	13.2	4	3

We see from Table 2 that traditional private equity tend to have higher performance on average (43% compared to 32% for listed private equity), but they are smaller is size, make less deals, are less affiliated and are almost similar to listed private equity in terms of activity status and organizational structures. However, in the top percentile, TPE are similar to LPE in terms of size but strike higher numbers of deals. These features are important to identify as they will drive our specification. They should also be viewed in a relative way when explaining performance and with caution, especially at the lower percentiles. Using size for example, a smaller LPE can have similar performance to a bigger TPE, and vice-versa. We do account for these differences in our specification.

4. Empirical findings

In this section, we show and discuss our mainstream results on listed private equity performance compared to traditional private equity. First, we disentangle the causality of private equity performance and private equity listing by examining typical model specifications and pointing out their limitations for the purposes of our study. Second, we get into the detail of listed private equity and examine whether performance of LPE is linked to liquidity, with special attention brought to the effect of being part of an index.

4.1. Private equity performance and listing

To assess the relationship between private equity performance and listing, a natural setting is to rely on OLS and Probit regressions. We construct our variables as follows. We define performance as the ratio of successful exits to the total number of exits. A successful exit is a private equity divestment by way of either an IPO or M&A[32]. Size is proxied by assets under management (AUM) expressed in 2010 million euros. Because private equity is also a networking business[33], we proxy for that using an affiliation dummy, which is equal to one id the entity is a

[32] This is also the measure used by Hochberg, Ljunqvist and Lu (2007) and Phalippou and Gottschalg (2009)
[33] The General Partners sustain long-relationships with their Limited Partners. Impact on performance is therefore important as it influences subsequent fundraising and success of follow-on funds (Kaplan and Schoar, 2005)

member of a representative industry organisation[34] and 0 otherwise. We use the total number of deals up to 2010 as a measure for experience, and the median time to exit a portfolio company as an indicator of value creation. The median time to exit is the time in years between the investment date and the exit date. We account for IPO defaults by using a category variable "Status", which takes the value of 0 if the entity is defunct, 1 if the entity is inactive, 2 if the entity is moderately active, 3 if it is ceasing investment and 4 if it is actively seeking new investments. Finally, we use a category variable to control for the effects of listing structures, which takes the value of 1 if it is fund-of-funds, 2 if it is a management firm, 3 if it is a fund and 0 otherwise.

Panel A of Table 3 shows the OLS regression results of the performance variable against the listing dummy (specification 1) and against the listing dummy with the control variables (specification 2). Panel B of Table 3 report the Probit results of the listing dummy on the performance variable (specification 3) and on the performance variable with the control variables (specification 4).

From looking at the results, we clearly see that it is hard to positively assert that performance is negatively impacted by the event of listing, or that performance is worse for the listed entities. More than being faced with this causality problem, we note that including further variables is not helpful in disentangling the proper effect of listing in OLS, and of performance in Probit. Both specifications show high significance levels for the key explanatory variables and the control variables, and a still significant alpha.

Assessing performance is our context is therefore tricky because listing is not random in the universe of private equity. Because companies tend to exhibit higher returns prior to their IPOs, one might argue that LPE self-select. On the one hand, if we observe better performance after the IPO, we cannot rule out the possibility that this is the result of better performing LPEs being *already* better performers. On the other hand, if we observe worse performing LPEs after the IPO, one can argue that these worse performing LPEs still self-select and *"fool"* the market into giving them a premium when they IPO. The previously explained standard OLS and Probit models shown in Table 3 highlight this problem.

[34] Examples include affiliation to the National Venture Capital Association (NVCA) in the US or the European Venture Capital Association (EVCA) in Europe.

Table 3 : OLS and Probit Models for Performance and Listing. The dependent variable for the OLS estimation is performance. The dependent variable for the Probit model is the Listed dummy. Performance is the ratio of successful exits to total number of exits. AUM are total assets under management in 2010 million euros. Affiliation is a dummy for whether the entity is a member of an industry organisation. Total number of deals is the total private equity deals up to 2010, Median time to exit is the median time in years that every entity takes between the investment date and the exit date across its set of investments, Status is a category variable which takes the value of 0 if the entity is defunct, 1 if the entity is inactive, 2 if the entity is moderately active, 3 if it is ceasing investment and 4 if it is actively seeking new investments. Organizational structure is a category variable which takes the value of 1 if it is fund-of-funds, 2 if it is a management firm, 3 if it is a fund and 0 otherwise. T-statistics between brackets.

Panel A: OLS Model for performance and listing	(1)	(2)
Listed dummy	-0.11	-0.05
	(7.66)***	(3.63)***
Status		-0.02
		(7.84)***
AUM		0.00
		(3.24)***
Affiliation dummy		-0.06
		(9.39)***
Total Number of Deals		0.00
		(2.16)**
Median Time to Exit		0.00
		(3.02)***
Organizational Structure		0.01
		(4.20)***
Intercept	0.43	0.40
	(148.14)****	(29.46)***
F statistic	58.7	39.7
Adjusted R-squared	0.00	0.05

Panel B: Probit Model for performance and listing	(3)	(4)
Performance	-0.72	-0.60
	(5.69)***	(3.20)***
Status		-0.01
		(0.21)
AUM		0.00
		(4.99)***
Affiliation dummy		0.28
		(3.59)***
Total Number of Deals		-0.00
		(0.04)
Median Time to Exit		0.02
		(1.24)
Organizational Structure		0.04
		(1.30)
Intercept	-1.73	-2.01
	(32.91)***	(11.78)***

* $p<0.1$; ** $p<0.05$; *** $p<0.01$

To address this issue, we use propensity score matching (Rosenbaum and Rubin (1983), Dehejia and Wahba (2002)). Propensity score matching is a model which accounts for special characteristics that could have influenced the control group to get the studied treatment, and attributes probabilities based on these characteristics. In our case, the propensity score matching procedure identifies the entities in the traditional private equity group which could have listed based on the previously defined characteristics, and attributes scores (probabilities) for them to be eligible to listing. Propensity score matching can be done in different ways. Based on our vector of characteristics, we use 4 methodologies for robustness: nearest neighbour matching, radius matching, kernel matching and stratified matching. We then measure performance differentials between LPE and their matches and look for possible significant differences. Table 4 describes the average listing effect on performance using nearest neighbour matching (Panel A), radius matching (Panel B), kernel matching (Panel C) and stratified matching (Panel D).

Table 4 : Average listing effect using propensity scores. Treated is the number of listed private equity entities. Controls is the number of traditional private equity entities matches using propensity scores. ATT is the average treatment effect of being listed. Analytical standard errors and t-statistics for the average treatment effect differentials are also reported. Bootstrapped standard errors with t-statistics are reported between brackets

Treated	Controls	ATT	Std. Err.	t-statistic
Panel A: Nearest neighbour matching				
145	140	-0.064	0.024	-2.715**
Panel B: Radius matching (10% radius)				
145	4,883	-0.057	0.014	-4.113***
Panel C: Kernel matching				
145	4,883	-0.058	(0.014)	(-4.116***)
Panel D: Stratified matching				
145	4,883	-0.049	(0.014)	(-3.556***)

* $p<0.1$; ** $p<0.05$; *** $p<0.01$

LPE investments significantly underperform TPE investments by 4.9% to 5.8% on average and this result is robust to different matching procedures.

The average treatment effect is significant using nearest neighbour matching only because we allow for replacement (i.e. a match for one LPE can be a match to another LPE). Even with that, and because of the discrepancies in some of the characteristics that we previously discussed, some LPE do not have suitable matches (140 possible matches for 145 LPE). For example, LPE tend to be larger in terms of size and fail to find suitable matches in the control group with other characteristics using distance as a matching method[35]. We overcome this problem by using the other matching procedures which better specify our case.

4.2. Listed private equity performance and liquidity

Indices impose minimum liquidity requirements for a constituent to be eligible for inclusion. We investigate the possible relationship between the underlying private equity performance and the liquidity of the listed entity. We then particularly investigate that relationship for index constituents that we were able to identify.

The individual measure of liquidity for index providers is the average annual trading volume[36]. We use that measure for our sample between the IPO date and 2010 (the end period of our sample). For the entities which did not survive until 2010, we compute the average annual trading volume from their IPO date until the date they withdrew from the market.

Table 5 shows summary statistics for LPE that are not part of an index (Panel A) and LPE that are part of an index (Panel B). Surprisingly, we observe that Index-LPE are almost similar in performance as non-Index LPE despite significant differentials in liquidity. Index-LPE are almost twice bigger in size than non-Index LPE, are 20% more affiliated and strike more than 3 times deal numbers compared to non-Index LPE. This is controversial as size, affiliation and the number of deals are positively related to performance, and possibly highlights the fact that index constituents do not fully reflect performance of the underlying investments, or at least not at the same frequency, as we further note that Index-LPE and Non-Index LPE are similar on average in holding periods (5.5 years), activity status (both are highly active on average) and organizational structures (both offer indirect exposure to private equity investment on average).

[35] This problem does not pertain to LPEs alone. For an example using LBOs see Gaspar (2012).

[36] Index providers either account for average daily traded volume over a year or average daily traded value over a year. We use the first because it is common to the three out of the four identified indices (See Appendix 2)

Table 5 : Summary statistics for LPE according to whether it is an index constituent. Performance is the ratio of successful exits to total number of exits. Liquidity is average daily trading volume in a year from the IPO until 2010 or delisting event, AUM are total assets under management in 2010 euros. Affiliation is a dummy for whether the entity is a member of an industry organisation. Total number of deals is the total private equity deals up to 2010, Median time to exit is the median time in years that every entity takes between the investment date and the exit date across its set of investments, Status is a category variable which takes the value of 0 if the entity is defunct, 1 if the entity is inactive, 2 if the entity is moderately active, 3 if it is ceasing investment to develop the exiting portfolio and 4 if it is actively seeking new investments. Organizational structure is a category variable which takes the value of 1 if it is fund-of-funds, 2 if it is a management firm, 3 if it is a fund and 0 otherwise.

	Performance	Liquidity	AUM (EUR Mil.)	Affiliation	Total number of deals	Median time to exit (years)	Status	Organization structure
Panel A: Non-Index LPE								
Nb. Obs.	169	117	113	169	169	165	169	169
Mean	0.3172	85,583.63	2,636.60	0.4497	61.2307	5.5096	3.3313	2.2958
SD	0.2131	23,6471.1	11,596.63	0.4989	122.0675	2.4304	1.3832	1.1982
Min.	0	7.95	0.8179	0	1	0.6	0	0
25th p.	0.1796	830.71	19.8609	0	9	3.8	4	2
Median	0.2727	5,140.1	61.5752	0	24	5.4	4	3
75th p.	0.3928	56,728.47	245.8615	1	66	6.95	4	3
Max.	1	1,564,506	87,807.58	1	1,221	13.2	4	3
Panel B: Index-LPE								
Nb. Obs.	37	31	34	37	37	37	37	37
Mean	0.3365	126,120.5	5,238.50	0.6486	216.64	5.5	3.7837	2.2972
SD	0.1223	229,713.2	13,833.65	0.4839	416.74	1.7096	0.8210	1.0766
Min.	0.1444	473.70	12.2930	0	6	0.3	0	0
25th p.	0.2244	18,594.04	162.09	0	61	4.65	4	2
Median	0.3333	52,015.98	577.09	1	89	5.4	4	3
75th p.	0.3896	126,149.8	3,231.84	1	225	6.3	4	3
Max.	0.5915	967,152.7	62,963.68	1	2,514	11	4	3

To identify specific LPE effects on performance, we regress the performance measure against a liquidity dummy that is equal to 1 if the liquidity measure higher than the minimum index threshold, and 0 otherwise, a home exchange dummy that is equal to one if the LPE is traded in its home country, and an index dummy which is equal to one if the LPE is part of an index and 0 otherwise. We also include previously defined control variables. Table 6 reports the regression results using the level variable for the liquidity, measured as the average daily trading volume in a year from the IPO until 2010.

Table 6 : OLS estimation of LPE subsample. Performance is the ratio of successful exits to total number of exits. Liquidity is average daily trading volume in a year from the IPO until 2010 or delisting event, AUM are total assets under management in 2010 euros. Affiliation is a dummy for whether the entity is a member of an industry organisation. Total number of deals is the total private equity deals up to 2010, Median time to exit is the median time in years that every entity takes between the investment date and the exit date across its set of investments, Status is a category variable which takes the value of 0 if the entity is defunct, 1 if the entity is inactive, 2 if the entity is moderately active, 3 if it is ceasing investment and 4 if it is actively seeking new investments. Organizational structure is a category variable which takes the value of 1 if it is fund-of-funds, 2 if it is a management firm, 3 if it is a fund and 0 otherwise.

	Performance
Avg daily traded volume	0.00
	(0.62)
Quoted @ Home Exchange	-0.02
	(0.53)
Status	0.00
	(0.27)
AUM	0.00
	(1.82)*
Affiliation	-0.03
	(0.70)
Total Number of Deals	-0.00
	(0.63)
Median Time to Exit	0.01
	(0.84)
Organizational Structure	0.02
	(2.06)**
Constant	0.21
	(3.29)***
F statistic	1.5
Adjusted R-squared	0.00

We see from the regression results that the performance still pertains to size and we note the significant effect of the organizational structure of the listed entity. Taken individually, liquidity, home-trading and being part of an index do not have a significant effect on performance. in

order to disentangle possible compounded effects from all three variables, we re-specify the liquidity variable by assigning a dummy for liquidity which is equal to one if the average daily trading volume crosses the liquidity threshold of index providers, and zero otherwise. Table 7 reports the results of the previous regression using interaction terms between liquidity, home trading and being an index constituent.

We observe that the inclusion of interaction terms brings the previous alpha from a significant 2.1% to 1.6%, and totally suppresses its significance. We further note the significant effect of the choice of the listing structure on performance. The higher the complexity of the structure (i.e. the lesser the exposure to private equity investments), the higher the performance of listed private equity. This means that increasing the complexity of the listing structure with regards to exposure to private equity companies (listed fund>listed fund-of-fund>listed GP>complex structures), significantly increases performance by 3%. This figure is consistent with what industry analysts and private equity investors require as a minimum return in excess of the stock market to compensate for the risks associated with investing in private equity portfolio companies, known to be illiquid and more exposed to risks of bankruptcy or financial distress.

Table 7 : OLS estimation of LPE subsample with interaction terms. Performance is the ratio of successful exits to total number of exits. Liquidity is average daily trading volume in a year from the IPO until 2010 or delisting event, AUM are total assets under management in 2010 euros. Affiliation is a dummy for whether the entity is a member of an industry organisation. Total number of deals is the total private equity deals up to 2010, Median time to exit is the median time in years that every entity takes between the investment date and the exit date across its set of investments, Status is a category variable which takes the value of 0 if the entity is defunct, 1 if the entity is inactive, 2 if the entity is moderately active, 3 if it is ceasing investment and 4 if it is actively seeking new investments. Organizational structure is a category variable which takes the value of 1 if it is fund-of-funds, 2 if it is a management firm, 3 if it is a fund and 0 otherwise.

	Performance
Not traded in home exchange	0.00
Is traded in home exchange	0.05
	(0.62)
Below liquidity threshhold	0.00
Beyond liquidity threshhold	0.08
	(1.03)
Non-Index LPE	0.00
Index LPE	-0.06
	(0.61)
Not traded in home exchange * Below liquidity threshhold	0.00
Not traded in home exchange * Beyond liquidity threshhold	0.00
Is traded in home exchange * Below liquidity threshhold	0.00
Is traded in home exchange * Beyond liquidity threshhold	-0.13
	(1.31)
Not traded in home exchange * Non-Index LPE	0.00
Not traded in home exchange * Index LPE	0.00
Is traded in home exchange * Non-Index LPE	0.00
Is traded in home exchange * Index LPE	0.15
	(1.22)
Below liquidity threshhold * Non-Index LPE	0.00
Below liquidity threshhold * Index LPE	0.00
Beyond liquidity threshhold * Non-Index LPE	0.00
Beyond liquidity threshhold * Index LPE	0.01
	(0.15)
Not traded in home exchange * Below liquidity threshold * Non-Index LPE	0.00
Not traded in home exchange * Below liquidity threshhold * Index LPE	0.00
Not traded in home exchange * Beyond liquidity threshhold * Non-Index LPE	0.00
Not traded in home exchange * Beyond liquidity threshhold * Index LPE	0.00
Is traded in home exchange * Below liquidity threshhold * Non-Index LPE	0.00
Is traded in home exchange * Below liquidity threshhold * Index LPE	0.00
Is traded in home exchange * Beyond liquidity threshhold * Non-Index LPE	0.00
Is traded in home exchange * Beyond liquidity threshhold * Index LPE	-0.04
	(0.34)
Avg daily traded volume	0.00
	(1.03)
Status	0.01
	(0.48)
Capital Under Management (EUR Mil)	0.00
	(1.09)
Affiliation dummy	-0.03
	(0.81)
Total Number of Deals	-0.00
	(1.30)
Median Time to Exit (Years)	0.01
	(0.58)
Organizational Structure	0.03
	(2.50)**
Constant	0.16
	(1.62)
Adjusted R-squared	0.01

5. Conclusion

We study the performance of listed private equity compared to traditional private equity. We find that listing impacts the performance of private equity by 4.9% to 5.8% on average. We assess the possible explanations of performance differentials and find that organizational structures significantly affect the performance of listed private equity. The joint effect of liquidity, trading in the home country and being an index constituent decreases the alpha the listed private equity by 5% and alleviates its significance. Our results are in line with what has been recently documented for hedge funds (Lin and Teo, 2016). Hedge funds managed by listed firms underperform hedge funds managed by unlisted firms.

In further work, we examine whether the underperformance of listed private equity can be further explained by side-effects of increased visibility from the IPO, agency problems, or fundraising pressure prior to the listing. Moreover, we investigate the impact of listing on value creation for the portfolio company both in the cross section of listed and traditional private equity, and through time. We further conjecture about the continued trend of private equity listings by accounting for market condition, compensation schemes and skill and luck.

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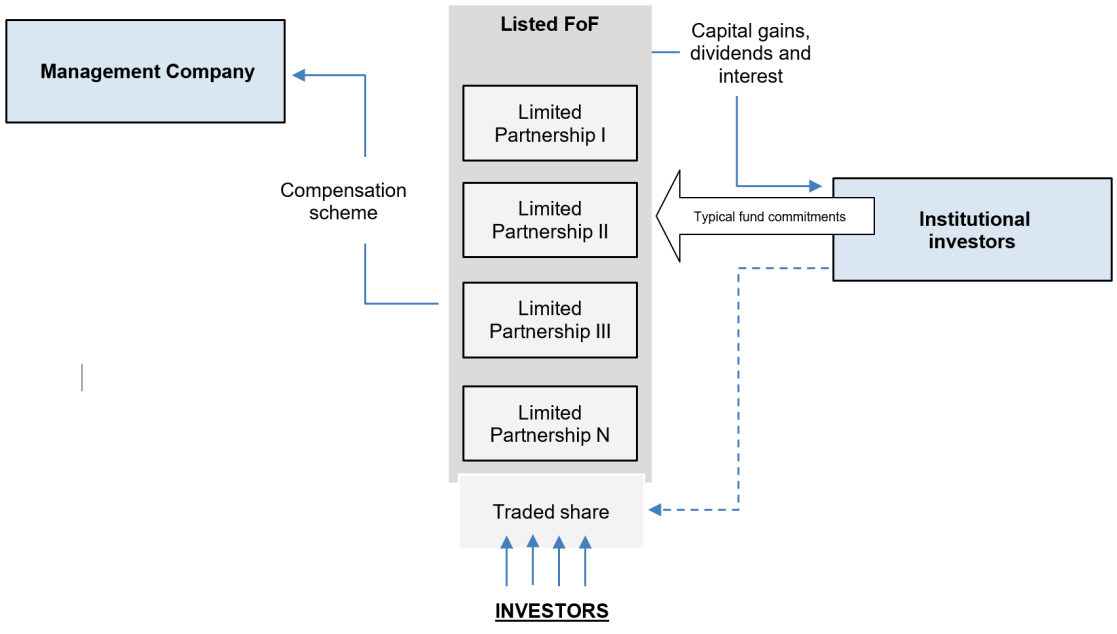
7. Appendices

Appendix 1 : the organizational structures of listed private equity

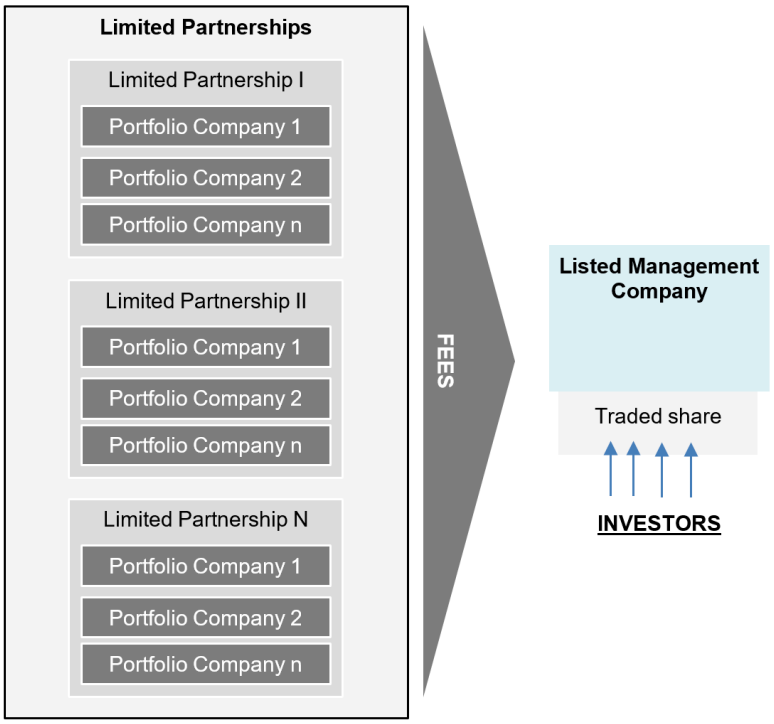
The below figures illustrate the generic forms of listing inherent to the limited liability structure shown in figure 1 and the kinds of exposure they provide to their investors. Other than these structures, tax benefits inherent to other listing forms such as BDCs in the US or investment trusts in the UK attracted listed private equity. Table 8 reviews the main features of such listing structures.

Figure 3 : generic structure of a listed fund of funds (listed LP). This form of listing gives retail investors exposure to a portfolio of limited liability partnerships, hence indirect exposure to private equity portfolio companies. It also adds an extra layer of fees as fund-of-fund fees add up to management fees and carried interest. Listed funds of funds invest in traditional limited partnerships as limited partners, therefore not providing direct exposure to the portfolio companies. They also take the form of listed entities (PLC, Ltd, AG, etc.). An investor who owns a share of a listed fund of fund has a portfolio of diversified limited partnerships (i.e. private equity funds). Examples of such entities include SVG Capital, Aberdeen Private Equity Fund or NB Private Equity Partners.



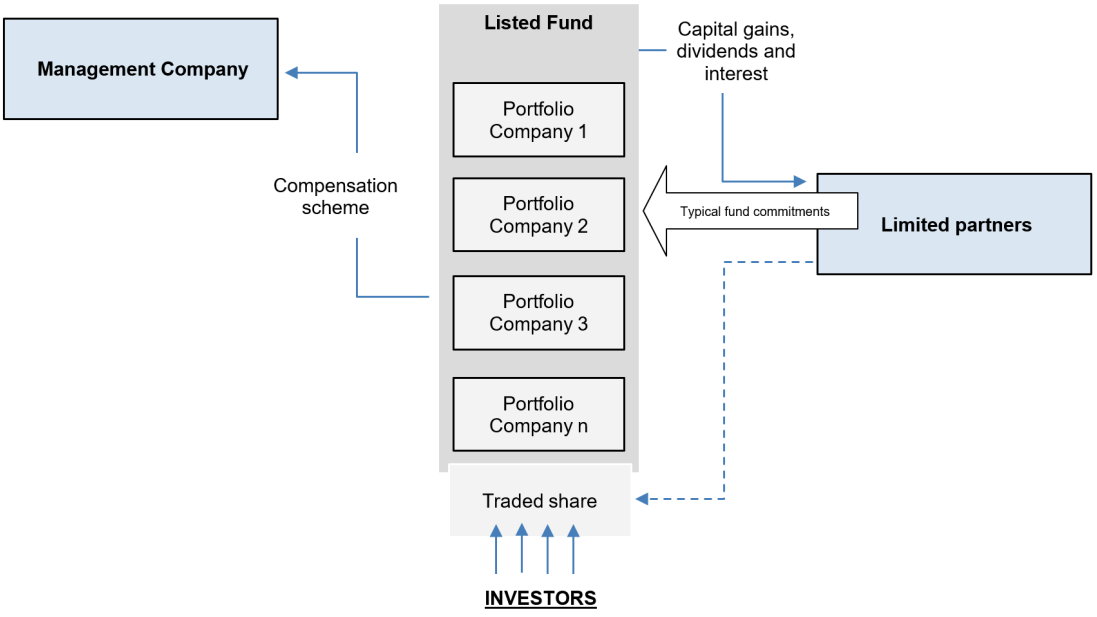
Source: Adapted from sample IM and IPO prospectuses of listed funds

Figure 4 : generic structure of a listed private equity firm (listed GP). This kind of listing only offers the investor an exposure to the management firm's fees. Listed private equity managers only hold interest in managed portfolios and therefore have no direct or indirect exposure to the underlying investments. The retail investor who buys shares of listed private equity managers gains interest in the GP's fees.



Source: Adapted from sample IM and IPO prospectuses of listed funds

Figure 5 : generic structure of a listed fund. A retail investor who holds a share of a listed fund has direct exposure to the underlying portfolio companies. Listed funds take the form of investment companies, which are directly invested in the portfolio companies. They usually take the form of public limited partnerships or other standard legal structures (PLC, Ltd…). They divest after the traditional private equity lock up period (10 years extendable to up to four additional years) and they follow the traditional private equity cycle for most of their investments[37]. Shareholders of such companies have direct exposure to the business of the portfolio companies. An example of listed funds is HBM BioVentures.



Source: Adapted from sample IM and IPO prospectuses of listed funds

[37] Most investment mandates do not restrict investment to private companies only, allowing the PE portfolio to be partially diluted. However, for the purpose of our study, we make sure that at least 50% of the underlying portfolio is strictly comprised of private companies.

Table 8 : Other LPE listing structures

Other LPE listing structures	Description
Business Development Companies (BDCs)	BDCs are listed closed-end entities which invest in small and medium enterprises (SMEs). They are bound by the regulators to provide significant assistance to the investee companies in order to insure their development and have the particularity to allow access to these companies to non-accredited investors. BDCs are highly regulated in a way that can make them comparable to private equity funds in many aspects. For instance, at least 70% of their assets must be private companies and they must distribute a minimum 90% of their income to their shareholders.
Venture Capital Trusts (VCTs)	They developed in the UK with the purpose of investing in seed, early stage and growth companies. Their investments are not required to be private as they can also invest in companies which trade on the AIM, but some do have strictly or a majority of private holdings. They also benefit from several tax relieves provided they hold their investments for a certain period of time.
Structured Trust Acquisition companies (STACs)	have the particularity to be tax-structured entities which raise money on the public markets with the purpose of acquiring private companies that they identify prior to going public. They benefit from management and advisory services similar to private equity funds, and have long holding periods of their portfolio companies. The tax benefits are such that the STAC owners pay income tax on the firm's income and not the STAC itself, just like partnerships[38].
Special Purpose Acquisition Companies (SPACs)	entities that are registered with the SEC for an acquisition purpose/ target yet to be defined. SPACs are immediately liquidated if targets are not found within a specified period but they continue to trade under specific conditions, which gives them the reputation of being "shell companies" in their first stages. However, SPACs operate like buyout funds when they succeed.

[38] Also known as "pass through taxation"

Appendix 2 : A summary of LPE indices

Index	Constituents	Description / main eligibility criteria
LPX	A family of indices ranging from 50 to 112 constituents, diversified across regions, investment and financing styles.	A proportion of assets greater than 50% must be private companies.
ALPS - Red Rocks GLPE index	40 to 75 public companies representing a means of diversified exposure to private equity firms.	Eligibility: companies must invest in, lend capital to, or provide services to privately held businesses. The index is value weighted quarterly per modified market capitalization weights.
S&P Listed Private Equity Index	30 large, liquid listed private equity companies trading on exchanges in North America, Europe and Asia-Pacific.	The constituents must meet size, liquidity, exposure and activity requirements specified by S&P.
Dow Jones STOXX PE 20	20 largest private equity companies in Western European developed markets.	A minimum of 40% of private equity involvement can be held in private equity companies, such as "mezzanine", "venture capital", "buy-out" or "buy-in" and a minimum level of liquidity and a free-float market cap of at least EUR 75 million
Société Générale Private Equity Index (PRIVEX)	25 global private equity companies.	The companies must engage in private equity-style investing.

Source: indices' guides and factsheerts

Appendix 3 : LPE is not a standard homogenous universe

We show an example of difficulty in screening for listed private equity using the LPX index constituents and their industry classification[39].

3-digit SIC code	Number constituents under the same SIC code
131	1
356	1
489	1
505	1
609	4
615	22
621	1
628	8
641	1
653	2
671	13
672	33
673	1
679	7
736	1
737	1
738	2
809	1
871	1
874	1
N/A	8
Total	**112**

[39] From http://www.lpx-group.com/lpx/lpx-research/lpe-companies-list.html, visited on May 6th, 2015. SIC codes were compiled using Orbis database. The list of all private equity vehicles which LPX group tracks were publicly available until very recently, where access to the list through the website became restricted. However, LPX index constituents are still available through Datastream.