The benefits of size for private equity investors

October 2011

Preliminary

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We show that institutional investors exhibit considerable heterogeneity and cash (the amount allocated to private equity) is its foremost driver. We conduct a comprehensive survey of private equity investors worldwide. We find that other characteristics that broadly capture prestige and long-term relationships (e.g. investor type, tenure, total asset under management, and location) play virtually no role. Investors with more cash receive more favors (e.g. in terms of fees, covenants). They also exert more efforts when screening and monitoring funds, which is primarily due to having a larger number of employees. They also have a selection process which appears more pertinent. These results have implications for the organizational design of institutional investors and contribute to opening the black-box of the investment process in alternative asset classes.

We are grateful to the many investors who provided us with the data. We especially thank James Bachman and Peter Cornelius for their help in designing the survey. Our research assistants provided invaluable help in collecting the data: Jan Peter Gabrielse, Marlon de Haas, Femke Helgers, Joris Hoendervangers, Edvardas Moselka, Robin Rijnders, Jacco Vogels, and especially Yves Kessels. We thank Josh Rauh for valuable comments on the paper. We gratefully acknowledge funding from an EIBURS grant.

Institutional investors are often perceived as one homogeneous set of investors. However, and although institutional investors vary substantially from retail investors due to the larger size of their portfolio and resources available to them, the spectrum of investors may be less dichotomous and more continuous than often portrayed.

The heterogeneity across investor is probably magnified in alternative asset classes, such as private equity (Lerner, Schoar and Wong, 2007).[1] In that asset class, some investors such as Calpers, Partners group or AlpInvest manage portfolios of more than $25 billion of private equity investments while many investors handle only a few millions of private equity investments. In addition, according to Lerner et al. (2007) some investors such as Endowments are perceived as enjoying a lot of autonomy, substantial incentive pay, and having a very professional approach; while other investors such as corporate pension funds or banks often struggle to attract qualified staff, and are often broadly under-resourced. It is also the case that some investors have been investing in PE since the 1970s or 1980s, thereby having long relationships with funds while many investors started their private equity program only very recently (e.g. mid 2000s). Do these different characteristics matter in practice or can institutional investors be considered a fairly homogenous pool?

The answer to this question may have implication for regulation (the absence of which is justified by the homogeneity of institutional investors). But the answer also has important implications for the decision to invest of many investors and the design of their private equity program. For example, let us evaluate the potential benefit from investing in private equity for the Norwegian or Chinese Sovereign Wealth funds, two of the largest investors in the world yet private equity novices. On the one hand, we could think that it will be difficult for these investors to deploy capital because it is thought that to access better funds it is necessary to have a long standing relationship with them. On the other hand, one could think that all you need is cash. If you have cash, you can hire superior people, exert superior efforts and get better terms and conditions. If the latter is true the case for private equity investing is much stronger for these large but new investors.

Let us consider a second example. Following the perceived success of large Endowments such as that of Yale in venture capital, and further comforted by the finding that Endowments outperform in venture capital, a large number of small Endowments have targeted aggressive allocation to private equity.[2] If what explains investor heterogeneity is type (such as Endowment

[1] Private equity stands for what is usually referred to as venture capital and buyout.

[2] See OEUM case study available at the Oxford Private Equity Institute and anecdotal evidence such as this press coverage:" (…) The success of Harvard and Yale attracted imitators. After suffering endowment losses in 2001 and 2002, smaller schools looked to their Ivy League idols for guidance on bulletproofing their portfolios. "Alumni called me up and said, 'We're going to be just like Yale, right?'" recalls the CIO of one midsize endowment fund. As a result, many small schools crowded into hedge funds and private equity (…)" *Institutional Investor, November 4th, 2009.*

versus pension fund) this move is warranted, but if the source of heterogeneity is size or long-standing relationships, such actions may not be warranted.

In this paper, we provide evidence on investor heterogeneity by means of a survey.[3] We obtain close to 300 usable responses from over 30 different countries and span each type of institution. To our knowledge, it is the largest to date in terms of number of respondents, geographical coverage and scope. From a set of relevant answers, we build an index that we label "Limited Partner Efficiency Index" (LPEI) which simply adds up the answers to 20 questions very much in the spirit of the corporate governance index of Gompers Ishii and Metrick (2005). We also divide this index into three sub-indices (monitoring intensity, screening intensity and favoritism).

These indices are then related to investor characteristics such as cash committed to PE (labeled LP size), experience, country, and type.

The LPEI, each of the sub-indices and in fact each of the underlying questions are all strongly related to LP size. Interestingly, these indices are not significantly related to other characteristics. In particular, it is not related to tenure, showing that tenure may influence fund access but it does not influence any of the dimensions we are looking at. Also, AUM is not significant once cash is controlled for. It means that being a large organization is not enough, what is needed is to have cash to put into private equity. A large organization starting with a small allocation to private equity is not expected to rip out the same benefits as a smaller organization with more money in private equity. This means two things for the large sovereign wealth funds we took as a motivating example above. First, their large AUM will not bring them direct benefits if they do not allocate a large amount to PE. So starting small in PE to see how it is going is unlikely to bring significant benefits (unless GPs believe that they will allocate much more soon). Second, the fact they are novice to private equity should not be a handicap. If they have the cash they will be able to invest efficiently.

Next, we try to understand why cash is so important. Investors with more cash in private equity may find it easier to retain employees, may have bonus schemes, enjoy more freedom, attract more experienced employees, better staffed, be located in a financial center, etc. We asked related questions in our survey and the resulting control variables are not significant except for "team also manages hedge funds", number of professionals and fraction of quantitative screening.

We also directly document heterogeneity among institutional investors. Half have performance based salaries, half do not, half of the investors always receive side letters giving them special terms and conditions, half do not etc.

[3] Investor means the organization (e.g. Calpers) and not the individuals working for that organization.

We also look at the sub-sample of investors that are more VC tilted versus BO tilted. In terms of asset under management, buyout largely dominates. The average investor is split 80% buyout – 20% venture capital. Investors with more than 80% of buyout funds have their size that is less related to the LPEI. The effect is twice as large for those that are more VC tilted.

Effect is also much stronger for the sub-set with more than ten years of experience in private equity. This indicates the presence of a cross effect. One interpretation is that if one is old and small, it means that there is little hope for it to become big in the future so there is no need to favor it. Plus, employees may be less motivated because they know it will stay small. In contrast, a young and small investor may become big, which flips the above arguments.

Problem: In the final sample US investors are only 57 out of 218 (one quarter).

It can be argued that investor size is partly endogenous. In particular, it can be argued that current investor size (which is what we use) is caused by good past performance and thus past efforts. This reverse causality issue is however more plausible for results pertaining to monitoring and screening efforts than for those pertaining to favoritism. Yet, our results are strongest for favoritism. In addition, we replace current investor size with the one in year 2000 – which we ask investors in the survey. There is a sharp decrease in number of observations but the economic magnitude of the effect is similar and statistical significance remains at 1%. Finally, we ask investors how much their size depends on their own past performance (versus the overall industry performance).[4] Investors on average say that it is 50-50. We run the analysis for the investors that say that their size depends the most on their own past returns and those that say that their size depends the least on their own past returns. Results are similar in both sub-samples. We also exclude fund-of-funds because their size depends most on their past returns. Again, results are similar.

Try using AUM instead of size to see if robust

Finally, we look at the sub-set of large investors and try to identify the sub-set that is not making full use of their size. Given the reduction in number of observations it becomes more qualitative. We observe that the investors not negotiating contracts, not co-investing etc. report that they cannot because …

[4] In practice the asset allocation decision across teams (fixed income, domestic equity, foreign equity, private equity etc.) is decided using a model which takes as input expected return of the teams' benchmark. Hence allocation to private equity is primarily driven by the past and expected return of the private equity asset class and not of the team in place. Evidence is provided in numerous practitioner articles and case studies such HBS case on Harvard Management Company and Yale endowment.

Our study complements particularly well the recent work of Dyck and Pomorski (2011) and Cremers et al. (2011). They both document that larger pension funds perform better in private equity than smaller pension funds. Our study shows what makes larger investors different and thus provides a potential explanation for why they outperform.

More specifically, Dyck and Pomorski (2011) argue that larger plans outperform because shift towards asset classes for which scale and negotiating power matter such as private equity. They point out that larger pension plans probably have access to co-investment opportunities with no additional fees, and better negotiating power or a more sophisticated approach to contracts. Our survey brings some direct evidence supporting these conjectures. They also argue that part of the cost savings by the largest plans comes from internalizing management for their alternative portfolios. Our survey also brings direct evidence on this.

There are two contemporary surveys of LP investment practices we are aware of. Groh and Liechtenstein (2009) study how investors select Venture Capital funds.[5] Groh, Liechtenstein and Canela (2010) gauge the willingness of LPs to get private equity exposure in certain countries. They thus ask LPs about the importance they attribute to the legal environment or the financial market development.

Other related studies include those studying the relationship between LPs and GPs. Hochberg and Raugh (2011) expose the existence of a local bias by investors in PE and find that it is exacerbated for public pension funds. Such a bias, they show, comes at a substantial cost. Gompers and Lerner (1996) and Metrick and Yasuda (2009) study the LP-GP contracts. Sahlman (1990) describes some agency problems in venture capital organizations and how the contracts and operating procedures have evolved in response. Kaplan and Stromberg (2009) provide an overview. Phalippou (2009) emphasizes the lack of incentive alignment between LPs and GPs, particularly in buyout. Also related is the study of Gompers and Lerner (1998) who find that historic fund performance, GP's reputation (proxied by number of past IPO exits) are important determinants of a GP's ability to raise a new fund. Finally, the study by Lerner, Schoar and Wong (2007) is the first to point out the heterogeneity of institutional investors using venture capital as a laboratory. More specifically, they show how returns and the quality of re-investment decisions differ across institutional LPs. [6] On the practitioner side, the book by Fraser-Sampson (2007) is probably the most

[5] They have 75 respondents. Consistent with our results (section 2), they find that the following criteria are important: the expected deal flow and access to transactions, a VC fund's historic track record, its local market experience, the match of the experience of team members with the proposed investment strategy, the team's reputation, and the mechanisms proposed to align interest between the institutional investors and the VC funds. The level of fees payable to the funds and commitments of other reputed LPs, however, are not important selection criteria.

[6] See also Bennett, Sias and Starks (2003) who look at the preference heterogeneity across types of institutions in terms of stock size, liquidity, book-to-market ratio etc. And Cronqvist and Fahlenbrach (2009) who stress the importance of

comprehensive coverage of investors' due diligence practices but it does not quantify differences across investors.

Our results have important implications. They indicate that there may be significant size benefits when investing in private equity. This implies that there are significant benefits for investors pooling resources either directly or via fund-of-funds. Yet, this pooling obviously means an extra layer of fees (or costs) and investors thus face a trade-off. We document here the benefit side. Related to this point, our results, like those of Dyck and Pomorski (2011) suggest that there are gains to providing incentives for larger pension plans (and larger endowments) to open themselves to manage assets from smaller plans. This is already happening with a number of large European funds (e.g. APG of the Netherlands) and Endowments (Oxford Endowment, see Jenkinson) and is being considered by large Canadian pension plans such as Ontario Teachers Pension Plan and OMERS.

The opposite example exists as well. For example in Sweden the main pension fund was split in four independent funds (AP1, AP2, AP3 and AP4) because the government did not want most of the country's equity to be concentrated in one hand. Each of these pension funds invest in private equity independently, they carry their due diligence, negotiate terms and conditions, monitor independently. There are talks in Sweden about merging them back together. Evidence in this paper points towards potentially large benefits of doing so.

Our results also indicate that small investors could free ride on large investors by simply copying them. In practice, this is usually feasible because investment decisions of large investors are observable. We find, however, that small investors do not pay significant attention to the allocation of other investors, which exacerbate the puzzle.

In addition, a number of investors have recently contemplated entering this new asset class and many have done so over the last 5 years. Oftentimes investors start with small allocations and increase little by little their allocation and staff. Our results warn that this strategy may be costly. The size advantage we document is equivalent to a barrier to entry for PE investors; thus one rather starts with a large commitment or do not start at all.

The rest of the paper is organized as follows. Section 2 describes the data collection process, the coverage and the construction of our variables. Section 3 provides some preliminary empirical evidence on the link between investor characteristics and either investor efforts or investor favoritism. Section 4 provides some robustness checks we intend to run. Section 5 contains some analysis of investor returns. Section 6 briefly concludes.

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blockholders heterogeneity. They show that blockholders have different investment and governance styles, differ in their approaches to corporate investment and growth, their appetites for financial leverage, and their attitudes toward CEO pay.

2. Data

We conduct an online survey of Private Equity (PE) investors, a.k.a Limited Partners (LPs). Our questions relate mostly to how investors carry their due diligence for their investments in PE funds, which are run by PE firms, a.k.a General Partners (GPs). In this section, we first describe the content of the survey and the sample construction. Section 2.2 details the construction of our index (LPEI). Section 2.3 provides descriptive statistics on key investor characteristics and uses them to assess sample representativeness.

2.1. Survey design

We designed the survey with a senior LP executive. Next we ran the full survey with five different LPs with whom we have close contacts to fine tune the questions. The survey contains eight parts and is shown in the appendix. In *Part 1*, we ask general questions about the investor's organization. We ask for the organization's type (e.g. pension fund), location of the main office, and foundation year. Next, we ask questions related to PE activity such as when they started investing in buyout and venture capital, how many fund advisory board seats they have and the fraction of board meeting attended. We ask whether the team also manages other alternative investments (real estate, hedge funds) and the part played by external factors on the allocation to PE.

Part 2 is dedicated to asset allocation (Asset Under Management, Amount invested in buyout and venture capital) and the number of investment professionals. *Part 3* inquires about co-investment opportunities. We ask whether investors are offered such opportunities, how much they invested in them, and what are the reasons for rejecting or accepting such opportunities. *Part 4* asks about the investment committee. We ask whether it can take decisions autonomously, the type of voting system in place, how many members left over the last five years (measure of turnover) and the age and experience of the members.

Part 5 is dedicated to compensation policy. We ask whether part of the compensation is linked to performance, whether this part can be higher than the fixed salary; and whether staff members who are not sitting on the investment committee may receive such a performance-related compensation and whether this part can be higher than the fixed salary.

Part 6 asks about the contract between LPs and GPs, which is called the Limited Partnership Agreement (LPA). We ask whether they benchmark the LPA, and if so how much time they spend on it. We ask how frequently they negotiate these contracts and what terms they find essential (open field). Finally, we ask how frequently they obtain side letters (meaning a special deal on terms and conditions) and the Most Favored Nation clause (which ensure they obtained the best terms and conditions out of all those given to other investors).

Part 7 covers Due Diligence (DD) issues. We start by trying to capture effort level using three questions: i) do they compute their own performance measure, ii) how do they treat non-liquidated investments, iii) how frequently they interview portfolio company executives. Next, we ask about the fraction of funds that get selected for due diligence analysis and then committed to out of all the propositions they receive. Next, we ask investors to rate the different criteria they use when choosing funds. We also ask for the one that is the most important and how much time is spent on due diligence (distinguishing between internal and external). We ask these questions separately for their investments in first-time funds, first investments in a seasoned firm and for re-investments. Finally, we ask for the main motivation to outsource part of due diligence, ask how often and why they may have decided not to re-invest with a PE firm (if ever) and their motivation for investing in first time funds (when they do).

The last section, *Part 8*, tries to quantify the intensity of monitoring. We ask the fraction of portfolio companies for which they collect information on portfolio company fees, whether they track portfolio composition (in terms of industry, size and country) and whether they visit portfolio companies.[7]

To construct our sample of respondents, we use the 2008 PEI directory of Limited Partners. We emailed all of the xxx investors listed in the directory to introduce the survey and provide the website address for the survey. After sending the email, we contacted each investor by phone to ask whether they received the email, intended to participate and had any questions. Investors who respond to the survey can leave their contact details and about half of them do so. For investors who left their contact details and did not answer some of the questions, we follow up by phone. Half of these investors completed the whole survey after these follow-up requests.

We have received 3xx responses, which means a response rate of 15%. This response rate is similar to other academic survey although on the high side.[8] We believe it reflects a significant interest in the investor community about learning how others perform due diligence, which is how we presented the survey to investors.

The two main explanatory variables for investor heterogeneity are size (the allocation to PE) and type (e.g. public pension funds). We thus keep only the responses where these two pieces of information are provided which reduces the sample from 358 respondents to 268. From this set, we filter out an additional 19 respondents who invest only in fund-of-funds.

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[7] ***We had a part on fund access. We do not include it in the analysis because we are afraid that answers are not exploitable. May drop the PC fees (does not apply to VC). Slightly less than 25% of the respondents report some access issues. This makes it difficult to use. We asked how often they had experienced a partial or full refusal. Large investor are more likely to report access issues but this was attributed to the fact that small investors may not get invited to invest in the most prominent funds, so they do not get a chance to be rejected.***

[8] The fraction of the questions that are answered is also high. The median respondent files 72% of the questionnaire.

2.2. Limited Partner Efficiency Index

There are a number of outcomes that we want to relate to investor characteristics. These outcomes can be divided in three broad categories: favoritism, monitoring intensity and screening intensity. They are described in turn in this sub-section and a summary is shown in table 1. The Limited Partner Efficiency Index (LPEI) combines these three categories.

2.2.1 Favoritism index

2.2.1.a Favorable terms

The contractual rights of a Limited Partner (LP) in a private equity fund are governed by the Limited Partnership Agreement (LPA). Starting in the late 1990s, however, many investors have obtained special rights that are granted via separate "side letters". Side letters are used to grant special rights and privileges to selected investors. This may be because the investor is considered as strategic, or simply a large one, but it can also be because the investor is subject to government regulation (e.g., ERISA, the Bank Holding Company Act, or public records laws). In addition, because side letter terms vary from fund to fund, and from investor to investor within a given fund, limited partners may negotiate for a “Most Favored Nations” (MFN) provision that permits the election of certain benefits granted to other limited partners via side letters. In general, MFN guarantees that the investor has the best terms granted.

Side letters are therefore the prime way for a GP to favor some investors. In our survey 48% of the investors “always” negotiate the LPA (37% “sometimes”, 15% “never” negotiate it). When negotiating the LPA, one may obtain side letters. 44% of the investors report that they “always” obtain side letters (30% “sometimes”, 26% “never” obtain side letters). 38% of the investors report that they “always” obtain MFN (29% “sometimes”, 33% “never” obtain MFN).[9] *Thus, about half of the investors always negotiate the LPA and almost all of these always obtain a side letter and again almost all of these always obtain the guarantee that they have the best LPA.* Negotiating the LPA cannot really be seen as a favor. Obtaining side letters or MFN is; maybe use it to gauge screening. For the construction of the index we use “always obtain side letters” as a component rather than “always obtain MFN” because it is more evenly split.[10]

From a descriptive point of view, it is interesting to note how widespread side letters are. Three quarter of the investors have received some. It is almost the same proportion of investors who have received MFN at least once. It feels like there are two main LPAs: the default one and a special

[9] Correlation between always negotiating and always getting side letters is 63%.

[10] Using alternatives such as always getting MFN or the fraction of funds for which side letters or MFN are obtained leads to similar results due to a high correlation between these answers.

one, both of which are granted to a large group of investors. There may be some intermediary ones too but given how widespread MFN is, it is probably not much. This result implies that empirical research on GP-LP contracts may be hampered by the fact that the LPAs that may be observed by researchers are just a default template that applies only to a sub-set of investors. In addition, the fact that some investors systematically get MFN or side letters is a first indication that some investors are perceived as special and thus that investors are quite heterogeneous.

2.2.1.b Co-investment opportunities

The second category that captures favoritism is the ability to co-invest.[11] Co-investing means that a GP may invite an LP to co-invest with the fund in a specific company, without charging additional fees or charging much less. This can have a dramatic impact on the overall fee bill but also on gross performance because the GP may overweight the selected LPs in the best investments (and therefore squeeze out the non-participating LPs).

Anecdotally, a large investor recently told one of the authors that the reason why they invested in the buyout funds raised at the pick of the buyout boom (2005-2007) was because if they would not have participated, the large private equity firms would not have invited them to co-invest anymore. So it looks like co-investment is a sizeable carrot used by PE firms to reward or retaliate some of their investors.

Our survey gives the first evidence on how widespread co-investing is. First, we find that 78% of the investors have been invited at least once to co-invest. However, we find that a staggering 70% of the invitations get rejected on average and overall it is only half of the investors who ever have co-invested. It means that although most investors get invited, much less actually make co-investments. When we ask the fraction of the portfolio that is made of co-investments for the investors who do co-invest, the median is thus 0% (but the average is 5%). Hence we add a third component to the favoritism index and that is that the investor has some co-investments in its portfolio.

[11] The PE literature has studied compensation contracts between LPs and GPs (Gompers and Lerner, 1996, and Metrick and Yasuda, 2009, Phalippou, 2009, Phalippou and Gottschalg, 2009). A number of puzzles have emerged from this literature. First, fees are surprisingly large especially when performance is relatively low. Second, most of the fees seem fixed and not performance related. Third, the headline fees (management fees, carried interest and hurdle rate) seem remarkably stable across time and fund-raising cycles. However, besides Phalippou (2009), the literature has not mentioned existence of co-investments by LPs.

2.2.2 Screening intensity index

Our survey focuses on due diligence, i.e. the screening of the PE funds. We thus have a number of proxies for screening intensity. We selected these questions with an experienced investor who indicated what were key screening activities that not all investors do, nor were rare. First, one of the key elements when deciding to invest is past performance. Past performance is provided by the GP in the fund raising prospectus. It is however possible that this performance figures is too aggregated in a sense. For example a GP with high returns in its early funds and not in its later funds may pool all the funds together and give only one aggregate performance number. This is because when using IRR, this pooling generates a high overall return. Another example is that some GPs may include in the past performance figure the returns of the investments that some of the partners supervised when working for their previous employer; something the investor may want to take out of the track record. Another possibility is that the GP pooled together investments in venture capital and buyout and is now raising a buyout fund. Again, the investor may want to separate these two track records. For all these reasons, an LP may want to re-compute past performance. We thus ask whether investors use the underlying data given by the GP (or could be requested to the GP) to compute performance statistics themselves. We find that 58% of the LPs do.

Second, an important hurdle to evaluate a track record in practice is the valuation of Net Asset Values (NAVs). That is the valuation of unrealized investments. For example, KKR in its annual reports shows that 80% of all of their investments in dollar terms are unexited (check that). So it means that the past return LPs see is made up for 80% of unrealized investments. Importantly, these valuations are subjective. KKR for example explicitly state that they use an internal model. Hence prospective investors may want to re-evaluate that NAV. We find that 29% of investor do; 56% of investors just use the NAV given by the GP and 15% simply ignore unrealized investments.

Another common due-diligence item for investors is to interview executives of portfolio companies. The motivation for investors is to gain insight on whether the GP adds value to the portfolio companies, whether the GPs has a good reputation with entrepreneurs and executives in general to see whether future deal making will be more or less difficult. 45% of investors “always” interview portfolio company executives (46% sometimes; 9% never do it). The fourth and last component is simply the amount of time spent on DD (in numbers of days; full time equivalent). We ask this question separately for an investment in first time fund, for a re-investment (called re-up) and a first investment in a seasoned fund. The three figures are highly correlated and we choose to

use the latter because it has more observations. Next, we compute the median and create a binary variable (0/1) depending on whether the investor spends more or less than 15 days (the median).[12]

2.2.3 Monitoring intensity index

Monitoring activities are probably the most difficult to capture. The main way investors monitor is by seating on advisory boards.[13] Advisory boards of funds include limited partners and are often designed to provide access to deals or technical expertise. Advisory boards are less formal (and have no legal obligations) than traditional boards of directors, but sometimes provide guidance and oversight for the operation of the fund. Sometimes the board may be involved in portfolio company valuations. GPs are those inviting LPs to seats on the advisory board.[14]

We thus ask investors for the number of board seats they have. Obviously, we need to scale this by the number of funds they have and we need to require investors to have a minimum number of funds (which we set to 5).

We use two more proxies for the monitoring intensity. One additional proxy is the visit to portfolio companies. This means visiting companies that are held by the GPs in which the LP is invested, or in other words visiting what the LP owns in-fine. Not surprisingly it is not commonplace and relatively few LPs say they always do so (9%) but interestingly 32% report that they never do so. As a result we create a binary variable which is one if an LP may visit a portfolio company (that is, sometimes or always) and is zero if it never does so.

Tracking portfolio company fees. 65% keep track of them (i.e. two thirds of the investors). But this is more of a BO thing so we limit the sample to those who report holding more than 5 BO funds.

Attendance to board meetings. This seems to be a natural variable to add. However it makes little sense to use this variable for LPs with no or very few board seats, which means that we lose a large number of observations. Importantly, these lost observations will be overwhelmingly the investors making the least effort (since they have little or no board seats). If we focus on those with more than say 5 board seats we throw away half of the sample. Hence we keep this variable as a possible additional one to have in the section on the robustness of the index composition. The median investor attends more than 90% of the board meetings.

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[12] Note that for a first time fund the median is 20 days spent on due diligence and for a re-up it is a median number of 10 days spent on due diligence.

[13] Quite some research efforts have been devoted to studying the boards of public companies. We are not aware of work on advisory boards of PE funds.

[14] Being granted a board seat could also be seen as a favor. Doing so would not change results.

We also asked investors whether they track the industry/country exposures of their PE portfolio. We expected some differences but in 85% of the investors said they do. We thus also keep this variable for the robustness section.

Including attendance hurts results a lot, but stays signif.

2.3.4 The Limited Partner Efficiency Index

In a context similar to ours, the literature has opted for the building of a simple index (e.g. Gompers, Ishii and Metrick, 2003, Flops). It is a simple way to reduce the dimensionality of the problem and to improve on the robustness of the findings. This is our approach here too.

To construct our Limited Partner Efficiency Index (LPEI) we first compute three sub-indices based on the variables described above. The first sub-index is the favoritism index. For it we average the four variables described in sub-section 2.x above and in table X: "Side-letters", "Most Favored Nation", "Invited to co-invest", and "Hold co-investments". To avoid loosing observations we take the average across the variables for which we have at least one valid answer. The favoritism index then varies between 0 and 1, with an average of xx and xx observations (see table 2).

The second sub-index is the screening intensity index. We average the four variables described in sub-section 2.2.2 above and in table X: "Own return calculation", "Own NAV calculation", "Interview companies' executives", and "Time spent on screening". Here too, we take the average across the variables for which we have a valid answer but require that at least one answers are valid.

I skept time spent on benchmarking LPA. Could add it, but it is not working very well.

The third sub-index is the monitoring intensity index. We average the four variables described in sub-section 2.2.2 above and in table X: "Own return calculation", "Own NAV calculation", "Interview companies' executives", and "Time spent on screening". Here too, we take the average across the variables for which we have a valid answer but require that at least two answers are valid

Next, we compute the LPEI as simply the average (equally-weighted) of these three sub-indices for each investor. The index construction is therefore straightforward. Obviously, however, it does not accurately reflect the relative impacts of different provisions, but it has the advantage of being transparent, simple and agnostic about the relative efficacy of any of these provisions. Linked to the relative impact issue is the fact that one may dispute the validity of including some of the variables we include. It is therefore important to see how excluding some variables affect results. This is an exercise we do in the robustness section (xx)

Table 2 shows descriptive statistics on the index and its three sub-indices.

Correlation between sub-indices are not very high. Maybe a bit puzzling. May be worth looking at the data more closely.

Could be interesting to filter out LP size and see what is left of the correlation – probably very little.

2.3. Key investor characteristics and sample representativeness

From the part 1 and 2 of the survey, we obtain key investor characteristics. The first set of key characteristics is type. This is motivated mainly by the study of Lerner et al. (2007) who points out that an important source of heterogeneity across institutional investors is their organizational type. They argue, for example, that Endowments generally benefit from more flexibility when investing and that shows up mainly in asset classes such as private equity. We ask for the organization type by offering eleven choices plus an open field for "other".[15] From these entries we create five types: i) Pension funds, ii) Fund-of-funds, iii) Endowments (which include foundations), iv) Financial institutions (banks, insurance companies, asset managers), v) Other (sovereign wealth fund, family desks, corporate, other…). The sample splits about equally across these five types as shown in Table 1 – Panel A. Compared to the universe (the PEI directory) we have less xxx and more xx, but the differences are not statistically significant.

The second set of characteristics is the country where the PE investment committee (or the person taking the PE investment decisions) is located. Investors located in the USA may have access to a more skilled labor market, may be seen as more prestigious etc. An outstanding feature of our study is that it provides a global perspective as it spans 23 different countries. Because we cannot include each country separately, like with types, we pool countries together to form regions. We distinguish between the USA, continental Europe (i.e. Europe excluding the UK and Scandinavia), the UK, and Scandinavia. The USA and continental Europe represent 30% of the sample, the UK and Scandinavia about 10% each. Next come three countries with about 5% of the observations these are Canada, Japan and Australia. The rest of the world also weights 5% of the sample. It includes countries like South Africa, South Korea and Mexico. Compared to the universe (the PEI directory) we have less xxx and more xx, but the differences are not statistically significant.

Most investors are located in the US and on continental Europe (i.e. ex-UK and Scandinavia). They both represent a quarter of the respondents. UK and Scandinavia represent 9% and 12% respectively of the respondents. Japan and Australia are well represented with 5% and 6% of the respondents respectively. The rest of Asia is another 5% and the rest of the world 4%. In total we have xx individual countries.

Need to have here the same N_obs as in table 2: 246 – And in regressions. There is only one missing mother age: look if can find it.

[15] For pension funds we also ask if they are public or private. For Endowments we also ask if it is a private or a public school.

The third key characteristic is investor size (as of 2008). We split the sample in about five equal groups: those with size below $100 million (24% of the sample), between $100 million and $250 million, between $250 million and $500 million, between $500 million and $2 billion, and above $2 billion (19% of the sample).[16]

Our median respondent has a PE allocation not significantly different to that of the median PE investor. However, we have fewer very large investors than there are in the population. As a result, the average PE allocation is smaller in our sample than in the population. It seems natural that investors for which portfolios are more tilted towards PE are more eager to answer this type of survey.

The fourth characteristic is experience. This is a natural explanatory variable because it is often thought that in private equity having long-standing relationships is important (references !?). We ask the investor to indicate the year when they started to invest for the first time in either BO or VC; from there we measure their experience in number of years.

The median starting year for PE investing is 1997 in the population and it is 1999 in our sample. Hence respondents are slightly less experienced than the median PE investor.

We also use AUM is a proxy for the institution prestige. For example, Axa the French insurance company has a 20 billion PE portfolio. What helps them most? The large size of their PE or the fact that Axa is very large hence a prestigious LP.

Table x

Overall, our sample is similar to the population except for two notable features: our over-representation of funds-of-funds and a lower representation of corporate investors and asset managers. We conjecture that funds-of-funds may find our survey more important because due diligence is at the core of their business. We also notice the presence of both investors that have a long tradition of PE investing (like pension funds and endowments) and investors that are thought to be less familiar with this asset class (like family offices and banks).

[16] The median LP has an AUM of about $2 billion and the private equity part is worth $360 million. The average allocation to PE is 38%. This high number is due to several investors having 100% in private equity, which is the case mostly for fund-of-funds. In terms of numbers of funds, they hold on average 43 BO funds and 23 VC funds.

3. Empirical analysis

3.1. LPEI and key investor characteristics

We find that investor size is the single most important characteristic. Larger investors engage is more intense due diligence and monitoring. Larger investors are also found to be significantly favored by PE funds.

Interestingly, PE allocation appears to absorb any differences across investor categories.

Rene said that if you do more, you do not care so much because well diversified, so should spend less time. Also, that large organization cannot rely on soft information so much, so should use more quantitative stuff (check if true!)

Fixed cost / specialization

Difficulty level is different: so starts with easiest

3.2. What makes larger investors special?

In the previous sub-section we have regressed our index on a set of explanatory variables which we can reasonably think of as exogenous. The conclusion from this analysis is that what drives investor heterogeneity is the cash they have invested in PE. It is naturally interesting to go ask what is different about these larger investors. Being large has a number of consequences. LPs can be organized in larger teams, both in absolute and relative (to the number of funds) terms. The team investing in PE may be more specialized. But it can also be that larger investors have a culture of performance-based compensation, that they find it easier to retain employees. For example, when Lerner et al. (2007) proposed an explanation for the better performance of some investors, they mentioned lower employee turnover, incentive pay in place and less conflicting objectives. It may just happen that larger investors have such characteristics.

To evaluate potential channels, we add a number of such (endogenous) variables to the base specification described above. NB: The endogeneity of these variables is tricky.

We find that if three variables are present at the same time then size looses its significance. These are: i) the PE team also manages hedge funds, ii) number of professionals, iii) incentive pay. If only two of these three variables are included size remains significant.

This gives an indication as to why large PE investors are special. It is because they are focused on PE, have more staff which in turn can specialize and have staff that is incentivized. Obviously it is not causal. But this shows what variables are most closely related to both LP size and our LP efficiency index.

Panel B also shows that there are other variables that are significant but they do not explain LP size away. First, is a proxy for skills. More skilled people need to make less effort. We use experience of decision makers. LPs with more experienced individuals are more efficient (according to our index). A second important control variable measures how quantitative screening is. Different type of screening may require more work. Not surprisingly, we find that the more quantitative screening is, the higher our screening index. This control does not affect the effect of size though. Third, the number of investment professionals per fund. It shows that it is not being well staffed that matters but to be a lot of people. This indicates economies of scale. When more people are present they can each specialize on something (e.g. NAV evaluate, computation of performance, contracts etc.) Fourth and finally, we have a control for “PE team also manages real estate”. It is the same idea as with hedge funds; namely that the PE team cannot specialize as much as they could. It is significant but does not affect LP size.

We have also run these regressions with other control variables, which turned out not to be significant. We thus did not tabulate the results. These non-significant variables are detailed here:

. The location of the LP may matter if location gives preferential access to information or networks. For this, we use a dummy variable that identifies financial centers, defined as a country's main financial city where a stock exchange is also located (for the US we employ the official list of stock exchanges provided on the SEC website).

. Independence of the IC, voting mechanism, age of IC members, fraction of fund they commit to (wrt funds going through screening; measures selectivity), outsource DD, number of funds under management, hierarchy (fraction of IC who can vote).

. Importantly, our measure of turnover ("there has been some turnover of IC members over the last five years") is not significant. Neither is our measure of conflicting objectives (14% of investors say that other objectives are not irrelevant).

Could add AUM here as mentioned elsewhere, but it is not an endo variables

Investors from a large AUM organization may get favored because they can potentially invest much more money. Those who are investing for long (tenure) are probably more prestigious investors and as such may get a good deal. To distinguish between prestige and experience, we look at staff tenure (experience) versus investor tenure (prestige).

There are also Behavior variables. This may be done later.

Here are variables that can be used:

For the essential terms of the LPA, fees are almost always answered (90%), next Key Man clause is mentioned half of the time, the rest is mentioned less than one in four. We thus retain: “Key man clause is essential”.

Why reject re-investment, investing in first time fund

Main reason to reject is risk, skills, alloc

Main motivation is fee reduction

Multiple rather than IRR

Activism did not work this is how it was constructed: One is whether the LP has in the past decided to refuse re-investment in a PE fund. The idea is that refusing to re-invest requires an active approach to evaluate the performance of the previous fund. A passive investor may always re-invest Second, we look at whether the LP decides whether to invest in a fund based on the participation of other ‘top LPs’. The idea is that relying on others’ decision reflects a more passive attitude. In a future version we will also measure the intensity of such reliance on the presence of top LPs. In a future version we also plan to build an measure of activism on PE funds’ advisory boards. These boards do not have the legal obligations and powers of those of listed companies, but allow LPs to discuss relevant issues with GPs and put pressure when there is disagreement. Since they require physical presence and preparation, they are clearly attended only by LPs who want to actively monitor their investments.

4. Robustness

In this section, we undertake a number of robustness tests. They enable us to gauge reverse causality and generate further evidence to understand better what drives the effect of LP size.

4.1. Sub-sample analysis

VC versus BO, US versus rest, old vs new, perf sensitive vs not.

Problem here is that it is difficult to compare if effect is bigger in one sub-sample versus the other given the different in number of obs. (e.g. US vs non-US).

Also here it would help not to require AUM, otherwise, we lose quite some obs.

4.2 Independent analysis for each component of the LPEI

We run a Probit regression for each component of the LPEI. Base specification.

4.3 Other methodology

Principal Component Analysis

The justification for using a principal component is that it is unlikely that any single variable perfectly captures investors' heterogeneity. Principal component analysis constructs a variable that summarizes the common information among different observable variables, thus reducing measurement error. The principal component analysis produces a factor with an eigenvalue larger than one that explains xx% of the variation in the above variables.

PCA has been used in Finance but only in a time-series context (e.g. Collin-Dufresne et al. in JF) but not in a multivariate context like here, as far as I know.

E.g. see Baber, William R., Surya N. Janakiraman and Sok-Hyon Kang (1996), "Investment Opportunities and the Structure of Executive Compensation," Journal of Accounting and Economics 21:297-318.

5. Conclusion

We conduct a comprehensive survey of private equity investors. To our knowledge, it is the largest to date in terms of number of respondents, geographical coverage and scope. Our goal is to provide a rigorous portrait of the average investor, and to document differences across investors. We focus on how investors' size, type (pension fund, family desk, etc.), location, experience, and compensation structure influence their actions. The actions we consider are investor's efforts and investor favoritism.

These results have important implications. They indicate that there may be significant economies of scale when investing in private equity. This implies that there are significant benefits for investors pooling resources either directly or via fund-of-funds. However, this pooling means an extra layer of fees (or costs) and investors thus face a trade-off. We document here the benefit side.

In terms of implications, our results indicate that small investors could free ride on large investors by simply copying them. In practice, this is usually feasible because investment decisions of large investors are observable. We find, however, that small investors do not pay significant attention to the allocation of other investors.

In addition, a number of investors have recently contemplated entering this new asset and many have done so over the last 5 years. Oftentimes investors start with small allocations and increase little by little their allocation and staff. Our results warn that this strategy may be costly. The size advantage we document is equivalent to a barrier to entry for PE investors; thus one may start with a large commitment and a large and experienced team or do not start at all.

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Table 1 – Definitions of the components of the LP Efficiency Index

This table provides the definitions of each component of the Limited Partner Efficiency Index (LPEI). There are three sub-indices, each of them carries an equal weight in the LPEI. The number of observation with valid answer as well as the average value (mean) is shown for each component. The superscript ** indicates that the set of possible answers to the question are: i) always, ii) sometimes, and ii) never; the respondent can also skip the question.

Name	Definition	N_obs	Mean
Favoritism			
Side letters	Answers "always" to "Do you obtain side letters?"**	207	0.44
MFN	Answers "always" to "Do you obtain Most Favored Nation?"**		
Invitation to co-invest	Answers YES to "Have you been invited to co-invest"	203	0.51
Amount co-invested	The answer to the following question is above median: "What fraction…" Median is XX%. **Has some co inv**	203	0.51
Screening intensity			
Own return calculation	Answers "always" to "Do you (or your consultant) calculate your own aggregate performance measure based on the information you are provided with?"**	220	0.59
Own NAV calculation	Selects "compute your own fair value estimation of the non-liquidated investments" to the question "What do you (or your consultant) do to measure GP's past performance?" Other answers are: "use the NAV provided by the GP" and "look only at the performance of liquidated investments"	165	0.29
Interview portfolio companies' executives	Answers "always" to "Do you (or your consultant) interview the executives of the GP's portfolio companies?"**	226	0.45
Benchmark LPA	Answers YES to "Do you benchmark the contract between your firm and the GP?"	220	0.67
Time spent on DD	The answer to the following question is above median: "How much time is spent on the typical due diligence for a seasoned GP's fund you are investing with for the first time (full-time employee equivalent, number of days)? (NB: Not how long the due diligence process is)". Median is XX days.	135	0.53
Monitoring intensity			
Board seats	Number of advisory board seats per PE fund is above median. Median is XX. VC and BO are combined.	138	0.50
Company visits	Answers "always" or "sometimes" to "Do you visit portfolio companies?"**	204	0.69
Track PC fees	Answers YES to "xyz". Excluded answers of LPs investing in more than five buyout funds.	111	0.65
Excluded:			
Negotiate LPA	Answers "always" to "Do you typically negotiate the contract terms?"**	206	0.61

Table 2 – Descriptive statistics of the LP Efficiency Index and its sub-indices

This table shows the correlation between LPEI and each of its three sub-indices as well as descriptive statistics for each index.

Correlation matrix	FI	SSI	MII	LPEI
1. Favoritism Index (FI)	1.00			
2. Screening Intensity Index (SSI)	0.26	1.00		
3. Monitoring Intensity Index (MII)	0.31	0.28	1.00	
4. Limited Partner Efficiency Index (LPEI)	0.72	0.67	0.77	1.00
Descriptive statistics				
Mean	0.54	0.52	0.63	0.57
Median	0.50	0.50	0.72	0.57
Standard deviation	0.36	0.31	0.39	0.27
N_obs	228	234	218	246

Table 3 – Key investor characteristics and sample representativeness

Preqin Universe is the proportion of LPs with a given type and country of location in the full Preqin directory.

Panel A: Investor type

Investor type	Definition	N_obs	Fraction of sample	Fraction in Preqin Universe
Pension funds	Public and corporate pension funds	63	22%	
Fund-of-funds		53	19%	
Endowments	Includes foundations	43	15%	
Financial institutions	Banks, insurance companies and asset managers	68	24%	
Other investor types	Family desk, government owned entities, corporations, other	55	20%	

Panel B: Region of investor location

Region of investor location	Definition	N_obs	Fraction of sample	Fraction in Preqin Universe
USA		79	28%	
Continental Europe	Europe excluding UK and Scandinavia	73	26%	
UK		28	10%	
Scandinavia	Denmark, Norway, Sweden, Finland	35	12%	
Canada		14	5%	
Japan		12	4%	
Australia		18	6%	
Rest of the world		13	5%	

Panel C: Investor size

Investor size (Amount invested in PE at the end of 2008 in million of U.S. dollars)	N_obs	Fraction of sample	Fraction in Preqin Universe
$0 < . \leq 100$	68	24%	
$100 < . \leq 250$	47	17%	
$250 < . \leq 500$	48	17%	
$500 < . \leq 2000$	66	23%	
$. > 2000$	53	19%	

Panel D: Investor experience

Investor experience (2008 minus the year firm started to invest in PE)	N_obs	Fraction of sample	Fraction in Preqin Universe
$0 < . \leq 4$ years	47	17%	
$4 < . \leq 7$ years	48	17%	
$7 < . \leq 10$ years	63	22%	
$10 < . \leq 15$ years	52	18%	
$. > 15$ years	52	18%	

Table 4: Efficiency index and investor characteristics

This table shows the results from a linear OLS regression. The dependent variable is the Limited Partner Efficiency Index (LPEI). Components of the LPEI index are shown in Table 2 and its construction is detailed in the text. T-statistics based on White robust standard errors are reported in italics below each coefficient. Superscripts a, b and c indicate that the coefficient is statistically significant at 1%, 5% and 10% level test respectively. A constant is included in each specification but not shown in the table. * denotes that the natural log of that variable is used.

Panel A: Base control variables

	Spec 1	Spec 2	Spec 3	Spec 4	Spec 5	Spec 6	Spec 7
LP size*		0.062[a]	0.056[a]	0.064[a]	0.061[a]	0.068[a]	0.062[a]
		7.459	*6.574*	*7.728*	*7.568*	*8.020*	*7.449*
Pension funds	-0.089[c]		-0.144[a]				-0.153[a]
	-1.771		*-3.130*				*-3.367*
Fund-of-funds	0.118[b]		0.059				0.034
	2.350		*1.185*				*0.664*
Endowments	-0.117[c]		-0.093				-0.054
	-1.749		*-1.632*				*-0.909*
Financial institutions	-0.047		-0.087[c]				-0.066
	-0.993		*-1.849*				*-1.395*
USA	0.025			-0.041			-0.031
	0.539			*-0.910*			*-0.712*
Continental Europe	0.010			-0.049			-0.072
	0.227			*-1.052*			*-1.637*
UK	0.032			-0.014			-0.035
	0.472			*-0.207*			*-0.588*
Scandinavia	0.063			0.019			0.051
	1.169			*0.353*			*1.010*
Mother's age*	-0.042[b]				-0.053[a]		-0.042[a]
	-2.122				*-3.923*		*-2.978*
Years of PE investing*	0.045					-0.044[c]	
	1.531					*-1.663*	
R-square	0.151	0.191	0.263	0.199	0.240	0.209	0.303
N_obs	234	246	246	246	245	234	245

Mother's AUM*	0.034[a]					-0.022[b]	0.001
	3.927					*-2.422*	*0.090*

Table 5: Favoritism index and investor characteristics

Same as table 4 but with the favoritism index as dependent variable.

Panel A: Base control variables

	Spec 1	Spec 2	Spec 3	Spec 4	Spec 5	Spec 6	Spec 7
LP size*		0.088[a]	0.085[a]	0.091[a]	0.087[a]	0.086[a]	0.087[a]
		8.648	*7.272*	*8.571*	*8.447*	*7.107*	*7.132*
Pension funds	0.073		-0.014				-0.001
	0.997		*-0.226*				*-0.009*
Fund-of-funds	0.127[c]		0.037				0.023
	1.716		*0.521*				*0.307*
Endowments	-0.112		-0.043				-0.037
	-1.236		*-0.568*				*-0.465*
Financial institutions	-0.045		-0.074				-0.053
	-0.628		*-1.113*				*-0.783*
USA	0.120[c]			0.022			0.042
	1.770			*0.383*			*0.680*
Continental Europe	0.107			-0.021			-0.010
	1.521			*-0.331*			*-0.149*
UK	0.176[c]			0.096			0.106
	1.871			*1.159*			*1.238*
Scandinavia	0.072			0.048			0.056
	0.911			*0.704*			*0.820*
Years of PE investing*	-0.032				-0.032		-0.027
	-1.158				*-1.643*		*-1.259*
Mother's age*	0.077[b]					-0.016	
	1.967					*-0.456*	
R-square	0.092	0.221	0.232	0.230	0.228	0.195	0.244
N_obs	218	228	228	228	227	218	227

Table 6: Screening index and investor characteristics

Same as table 4 but with the screening index as dependent variable.

Panel A: Base control variables

	Spec 1	Spec 2	Spec 3	Spec 4	Spec 5	Spec 6	Spec 7
LP size*		0.040[a]	0.032[a]	0.041[a]	0.039[a]	0.053[a]	0.036[a]
		3.689	*2.919*	*3.675*	*3.725*	*5.039*	*3.138*
Pension funds	-0.153[a]		-0.186[a]				-0.189[a]
	-2.712		*-3.408*				*-3.376*
Fund-of-funds	0.183[a]		0.140[b]				0.125[b]
	3.058		*2.374*				*2.016*
Endowments	-0.087		-0.069				-0.062
	-1.250		*-1.045*				*-0.867*
Financial institutions	-0.078		-0.118[b]				-0.102[c]
	-1.496		*-2.218*				*-1.938*
USA	-0.012			-0.029			-0.035
	-0.204			*-0.495*			*-0.568*
Continental Europe	-0.049			-0.058			-0.090
	-0.870			*-0.944*			*-1.550*
UK	0.003			0.000			-0.029
	0.044			*-0.004*			*-0.414*
Scandinavia	-0.069			-0.085			-0.054
	-1.196			*-1.289*			*-0.900*
Years of PE investing*	-0.004				-0.051[a]		-0.024
	-0.228				*-3.110*		*-1.391*
Mother's age*	-0.040					-0.097[a]	
	-1.401					*-3.620*	
R-square	0.171	0.058	0.189	0.068	0.094	0.112	0.205
N_obs	226	234	234	234	233	226	233

Table 7: Monitoring index and investor characteristics

Same as table 4 but with the monitoring index as dependent variable.

Panel A: Base control variables

	Spec 1	Spec 2	Spec 3	Spec 4	Spec 5	Spec 6	Spec 7
LP size*		0.057[a]	0.054[a]	0.060[a]	0.056[a]	0.068[a]	0.064[a]
		4.151	*3.633*	*4.456*	*4.086*	*4.674*	*4.396*
Pension funds	-0.135[c]		-0.177[b]				-0.203[a]
	-1.752		*-2.302*				*-2.706*
Fund-of-funds	0.049		-0.009				-0.035
	0.638		*-0.119*				*-0.447*
Endowments	-0.159		-0.137				-0.069
	-1.538		*-1.504*				*-0.700*
Financial institutions	-0.013		-0.085				-0.055
	-0.179		*-1.128*				*-0.723*
USA	0.005			-0.030			-0.028
	0.058			*-0.397*			*-0.378*
Continental Europe	-0.008			-0.029			-0.069
	-0.105			*-0.385*			*-0.989*
UK	-0.080			-0.082			-0.133
	-0.788			*-0.814*			*-1.430*
Scandinavia	0.158[b]			0.126			0.151[c]
	2.017			*1.542*			*1.917*
Years of PE investing*	-0.059[c]				-0.048[b]		-0.047[b]
	-1.922				*-2.118*		*-1.994*
Mother's age*	0.053					-0.043	
	1.218					*-1.110*	
R-square	0.095	0.075	0.107	0.097	0.093	0.093	0.152
N_obs	213	218	218	218	217	213	217

Table 8: Robustness tests

Show results for the base specification in different sub-sample and changing index construction. Dependent variable is the LPE index.

Maybe should do it for each sub-indices.

	LP size	Control variables	R-square	N_obs
Change sample – New sample is made of				
Full sample	0.063[a]	Yes	0.295	218
	4.645			
LPs with less than 80% invested in BO funds	0.122[a]	Yes	0.426	53
	5.021			
LPs with more than 80% invested in BO funds	0.061[b]	Yes	0.435	57
	2.085			
LPs with less than 10 years of PE investing	0.033[c]	Yes	0.280	117
	1.722			
LPs with more than 10 years of PE investing	0.092[a]	Yes	0.399	101
	4.325			
LPs whose allocation is influenced most by past return	0.069[a]	Yes	0.242	86
	2.581			
LPs whose allocation is influenced least by past return	0.053[b]	Yes	0.435	70
	2.502			
LPs with no holding of fund-of-funds	0.087[a]	Yes	0.246	60
	2.587			
LPs with some fund-of-funds	0.059[a]	Yes	0.431	111
	3.261			
LPs who gave their PE allocation in the survey (i.e. size does not come from Preqin or PEI directory)	0.061[a]	Yes	0.290	202
	4.417			
Non-US based LPs	0.055[a]	Yes	0.318	161
	3.873			
LPs that are not fund-of-funds	0.077[a]	Yes	0.267	177
	5.875		0.295	218
Change index composition				
Add xx to the index				
Add xx to the index				
Add xx to the index				
Add xx to the index				

Table X: Using past investor size

This table shows results for the base specification of table 4 when using the LPE index and its three sub-indices as dependent variables. The difference with tables 4 to 7 is the use of investor size as of year 2000 instead of year 2008.

Table X: Other control variables

LPEI

	Spec 1	Spec 2	Spec 3	Spec 4	Spec 5	Spec 6	Spec 7	Spec 8	Spec 9	Spec 10
LP size*	0.057[a]	0.039[a]	0.056[a]	0.060[a]	0.068[a]	0.060[a]	0.062[a]	0.060[a]	0.054[a]	
	6.515	*3.890*	*5.694*	*7.245*	*6.842*	*6.704*	*6.718*	*6.576*	*3.502*	
PE team also manages hedge funds	-0.105[a]								-0.114[c]	-0.121[c]
	-2.866								*-1.914*	*-1.675*
Number of professionals*		0.075[a]							-0.005	0.072[b]
		3.512							*-0.127*	*2.343*
Incentive pay			0.060[c]						0.075[c]	0.085[c]
			1.735						*1.647*	*1.858*
PE team also manages real estate				-0.070[b]					0.070	0.073
				-2.125					*1.293*	*1.298*
Number of funds per professional*					-0.034[b]				-0.066[b]	-0.024
					-2.086				*-2.232*	*-1.160*
How quantitative screening is						0.002[a]			0.003[b]	0.002[c]
						2.644			*2.340*	*1.782*
Experience of decision makers							0.007[b]		0.008	0.008
							2.126		*1.559*	*1.642*
No conflicting objectives								-0.085[b]	0.029	0.051
								-2.325	*0.509*	*0.788*
Control variables of the base spec.										
R-square	0.322	0.350	0.300	0.312	0.352	0.329	0.321	0.285	0.463	0.395
N_obs	244	224	207	244	144	139	151	146	81	81

	Spec 1	Spec 2	Spec 3	Spec 4	Spec 5	Spec 6	Spec 7	Spec 8	Spec 9	Spec 10
LP size*	0.079[a]	0.074[a]	0.077[a]	0.085[a]	0.080[a]	0.084[a]	0.080[a]	0.084[a]	0.086[a]	
	6.545	*4.796*	*5.087*	*7.012*	*5.015*	*5.829*	*5.403*	*5.997*	*3.528*	
PE team also manages hedge funds	-0.138[a]								-0.106	-0.116
	-2.668								*-1.017*	*-0.949*
Number of professionals*		0.040							-0.092	0.029
		1.501							*-1.504*	*0.550*
Incentive pay			0.093[c]						0.091	0.108
			1.751						*1.221*	*1.404*
PE team also manages real estate				-0.048					0.135	0.140
				-0.993					*1.520*	*1.490*
Number of funds per professional*					-0.003				-0.097[b]	-0.031
					-0.133				*-2.133*	*-0.920*
How quantitative screening is						0.000			0.003[c]	0.003
						0.079			*1.704*	*1.289*
Experience of decision makers							0.011[b]		0.014[c]	0.015[c]
							2.114		*1.726*	*1.824*
No conflicting objectives								-0.044	0.152[c]	0.187[b]
								-0.798	*1.950*	*2.138*
Control variables of the base spec.										
R-square	0.264	0.249	0.233	0.246	0.181	0.250	0.270	0.234	0.328	0.239
N_obs	226	212	205	226	141	139	145	145	81	81

	Spec 1	Spec 2	Spec 3	Spec 4	Spec 5	Spec 6	Spec 7	Spec 8	Spec 9	Spec 10
LP size*	0.035[a]	0.013	0.037[a]	0.034[a]	0.063[a]	0.038[a]	0.046[a]	0.038[a]	0.018	
	2.930	*1.041*	*2.842*	*2.950*	*4.671*	*2.817*	*3.322*	*2.830*	*0.823*	
PE team also manages hedge funds	-0.017								-0.070	-0.072
	-0.343								*-0.924*	*-0.933*
Number of professionals*		0.075[a]							0.155[a]	0.180[a]
		3.037							*2.913*	*4.390*
Incentive pay			0.039						0.071	0.075
			0.896						*1.087*	*1.151*
PE team also manages real estate				-0.060					-0.063	-0.062
				-1.360					*-0.862*	*-0.849*
Number of funds per professional*					-0.016				0.039	0.053
					-0.740				*0.950*	*1.591*
How quantitative screening is						0.003[b]			-0.001	-0.001
						2.358			*-0.787*	*-0.834*
Experience of decision makers							0.004		-0.001	0.000
							0.969		*-0.086*	*-0.050*
No conflicting objectives								-0.041	0.001	0.008
								-0.741	*0.007*	*0.081*
Control variables of the base spec.										
R-square	0.205	0.258	0.214	0.212	0.305	0.296	0.250	0.245	0.389	0.385
N_obs	232	214	206	232	139	139	151	146	81	81

	Spec 1	Spec 2	Spec 3	Spec 4	Spec 5	Spec 6	Spec 7	Spec 8	Spec 9	Spec 10
LP size*	0.054[a]	0.022	0.049[a]	0.061[a]	0.059[a]	0.058[a]	0.067[a]	0.062[a]	0.060[a]	
	3.602	*1.391*	*3.152*	*4.254*	*3.456*	*3.214*	*3.500*	*3.400*	*3.157*	
PE team also manages hedge funds	-0.184[a]								-0.160[c]	-0.170[c]
	-2.740								*-1.868*	*-1.801*
Number of professionals*		0.144[a]							-0.080	0.005
		4.700							*-1.587*	*0.093*
Incentive pay			0.071						0.057	0.071
			1.251						*0.817*	*1.016*
PE team also manages real estate				-0.085					0.138[b]	0.141[b]
				-1.546					*2.011*	*1.983*
Number of funds per professional*					-0.099[a]				-0.144[a]	-0.097[a]
					-3.593				*-4.071*	*-2.919*
How quantitative screening is						0.004[b]			0.006[a]	0.005[a]
						2.352			*3.549*	*3.002*
Experience of decision makers							0.004		0.010[c]	0.010[c]
							0.749		*1.699*	*1.772*
No conflicting objectives								-0.169[a]	-0.074	-0.047
								-2.728	*-0.869*	*-0.534*
Control variables of the base spec.										
R-square	0.177	0.222	0.161	0.154	0.259	0.155	0.135	0.145	0.425	0.383
N_obs	216	204	199	216	141	137	142	143	80	80

Table 9: Univariate independent multiple regression analysis

Each model is estimated with a linear Probit model. A constant is always included but not tabulated. Only t-statistics are reported.

Panel A

Name	% yes	LP size	Pension funds	FoFs	Finan-cial inst.	Endow-ments	USA	Europe Cont.	UK	Scandi-navia	LP age	Firm age	AUM	N_obs
Side letters	0.43	**2.41**	0.63	0.72	-0.29	-1.74	-0.01	-0.32	1.11	0.41	-1.64	-0.05	2.46	**189**
MFN	0.38	**2.20**	0.13	-0.04	-0.72	-2.46	0.25	-0.91	0.85	-0.48	-1.02	-0.09	2.17	**185**
Invited co-inv	0.81	**2.79**	0.21	1.17	0.58	0.41	1.62	2.09	1.39	2.36	0.52	-0.35	-0.57	**201**
Did co-inv	0.52	**3.41**	-1.85	-0.50	-1.07	0.12	0.50	-0.70	0.16	0.13	0.26	-0.86	-1.99	**184**
Own perf	0.57	**1.24**	-2.71	1.26	-1.01	-2.36	0.04	-1.22	-0.50	-1.41	-0.57	0.68	1.02	**198**
Own NAV	0.29	**1.92**	-2.20	0.57	-0.60	-1.40	0.46	-1.41	-0.71	-0.64	-1.57	0.19	-0.34	**161**
Interview	0.43	**1.88**	-0.46	2.38	-0.48	-0.49	-0.67	-1.70	0.40	-1.44	-3.06	1.31	0.19	**204**
Bench LPA	0.67	**0.58**	-2.12	-0.24	-0.82	-1.63	0.03	0.90	0.73	1.70	-0.43	-1.14	0.30	**200**
Time spent	0.52	**1.74**	-2.02	1.72	0.04	1.12	-0.21	-0.38	-0.25	0.47	-0.40	-0.74	0.41	**124**
Board seats	0.50	**0.43**	-1.64	-0.45	-0.18	1.15	-0.91	-1.55	-1.03	-0.28	0.86	-2.81	1.43	**123**
Company visits	0.68	**2.14**	-0.86	-0.35	-0.10	-0.27	0.86	0.94	-0.59	2.82	0.32	-1.71	0.17	**187**
PC fees	0.65	**1.23**	-2.13	-0.20	-2.16	-1.47	-0.14	-0.91	0.50	0.96	-2.24	0.38	0.15	**110**

Panel B

Name	% yes	LP size	Pension funds	FoFs	Financial inst.	Endowments	USA	Europe Cont.	UK	Scandinavia	LP age	Firm age	AUM	N_obs
Side letters	0.44	**5.22**	1.53	0.95	-0.13	-1.02	-0.20	-0.10	1.02	0.30				**207**
MFN	0.38	**4.38**	0.83	0.01	-0.32	-2.08	-0.52	-0.56	0.72	-0.67				**202**
Invited co-inv	0.78	**4.62**	-0.16	1.06	0.42	0.26	1.56	1.75	1.55	2.55				**223**
Did co-inv	0.51	**4.13**	-2.58	0.02	-1.33	-0.36	0.56	-0.93	0.42	0.19				**203**
Own perf	0.59	**2.50**	-2.36	1.16	-0.46	-1.90	-0.39	-1.26	-0.80	-1.48				**220**
Own NAV	0.29	**2.26**	-2.46	0.98	-0.72	-1.52	0.38	-1.49	-0.76	-0.67				**165**
Interview	0.45	**1.40**	-0.12	3.02	-0.27	-0.06	-0.66	-1.65	0.40	-1.42				**226**
Bench LPA	0.67	**1.12**	-2.15	0.31	-1.24	-1.72	-0.04	0.74	0.73	1.50				**220**
Time spent	0.53	**2.58**	-1.79	1.85	-0.28	0.79	0.15	-0.57	-0.12	0.24				**135**
Board seats	0.50	**2.41**	-1.65	-0.15	-0.17	1.28	-1.42	-2.03	-1.13	-0.49				**124**
Company visits	0.69	**3.54**	-1.49	0.03	-0.52	-0.63	0.79	0.36	-0.88	2.46				**204**
PC fees	0.65	**1.34**	-2.13	0.18	-2.30	-1.17	-0.09	-0.80	0.55	1.13				**111**

Appendix table: Other detailed descriptive statistics

Name	Col	Definition / Remarks	N_obs	Mean	Min	Q1	Median	Q3	Max
Firm experience	284	2008 minus firm/organization starting year	246	32	0	8	18	32	368
LP experience	285	2008 minus the starting year investing in PE (either VC or BO)	238	9	0	6	9	13	20
Employees	43	Number of employees in the PE division in 2008	233	8	0	1	3	8	120
Firm size	23	AUM of the whole organization in million of USD in 2008	175	14494	12	442	1976	8745	400000
LP size	25	Amount allocated to PE in million of USD in 2008	249	1802	0	105	360	1270	43910
% BO (size)	342	Amount allocated to BO funds in million of USD in 2008 divided by "LP size"; times 100.	114	70	0	57	80	95	100
% PE	307	Fraction of firm's asset allocated to PE in 2008; times 100.	175	38	0	5	16	92	100
Number of PE funds	282	Number of BO funds and VC funds held in total in 2008	160	45	1	8	24	60	400
Number of PE fund-of-funds	45	Number of PE fund-of-funds held in 2008	173	5	0	0	2	5	80
% BO (number)	343	Number of BO funds held in 2008 divided by "Number of PE funds"; times 100.	155	66	0	50	75	91	100
% Employees per fund	295	Variable "Employee" divided by variable "Number of PE funds"; times 100.	99	19	5	8	13	25	75
% External influence	20	Answer to the question: "xxx"	140	45	0	25	45	55	100
Amount in BO	*27*	*Amount allocated to BO in million of USD in 2008*	114	1607	0	44	242	828	36592
Amount in VC	*29*	*Amount allocated to VC in million of USD in 2008*	114	330	0	4	45	273	8000
Number of BO funds	*39*	*Number of BO funds held in 2008*	168	27	0	3	10	40	200
Number of VC funds	*41*	*Number of VC funds held in 2008*	171	16	0	1	4	15	200

Could also winsorized: * Winsorized at 100, ** Winsorized at 10000, *** Winsorized at 20; Winsorization aims at preserving anonymity and at making the 'mean' more informative. The minimum and maximum will not be shown to preserve anonymity. The separate BO & VC numbers will not be shown to save space

Appendix table: Descriptive statistics of the other control variables (not done)

Name	Definition	N_obs	Mean	Min	Q1	Median	Q3	Max
Human resources		282	0.60	0.02	0.25	0.69	0.91	0.98
Cover real estate	Selected "real estate" to "Does the team that manages PE investments also manages [real estate funds / hedge funds]"	278	0.37	0.00	0.00	0.00	1.00	1.00
Cover hedge funds	Selected "real estate" to "Does the team that manages PE investments also manages [real estate funds / hedge funds]"	278	0.26	0.00	0.00	0.00	1.00	1.00
Staffing	Number of investment professional divided by number of PE funds	105	0.37	0.00	0.20	0.41	0.54	0.93
IC age		114	49.09	32.30	44.30	48.83	53.50	67.50
IC experience		141	11.43	1.00	7.54	10.50	14.63	35.00
Turnover		117	26.99	0.00	0.00	20.00	40.00	300.00
Bonus	Answer yes to Do (some of) the investment professionals that do not sit on the investment committee receive a performance-related bonus?	203	0.56	0.00	0.00	1.00	1.00	1.00