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THE DISINTERMEDIATION OF FINANCIAL MARKETS: DIRECT INVESTING IN PRIVATE EQUITY

Lily Fang
Victoria Ivashina
Josh Lerner

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Cambridge, MA 02138
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ABSTRACT

One of the important issues in corporate finance is the rationale for and role of financial intermediaries. In the private equity setting, institutional investors are increasingly eschewing intermediaries in favor of direct investments. To understand the trade-offs in this setting, we compile a proprietary dataset of direct investments from seven large institutional investors. We find that solo investments by institutions outperform co-investments and a wide range of benchmarks for traditional private equity partnership investments. The outperformance is driven by deals where informational problems are not too severe, such as more proximate transactions to the investor and later-stage deals, and by an ability to avoid the deleterious effects on returns often seen in periods with large inflows into the private equity market. The poor performance of co-investments, on the other hand, appears to result from fund managers' selective offering of large deals to institutions for co-investing.

Lily Fang
INSEAD
Lily.FANG@insead.edu

Victoria Ivashina
Harvard Business School
Baker Library 233
Soldiers Field
Boston, MA 02163
and NBER
vivashina@hbs.edu

Josh Lerner
Harvard Business School
Rock Center 214
Boston, MA 02163
and NBER
jlerner@hbs.edu

1. Introduction

One of the enduring interests in the corporate finance literature has related to the ubiquity of intermediaries in financial markets. In the benchmark Arrow-Debreu world of complete information and perfect markets, there is no need for financial intermediaries: individuals and firms can transact seamlessly with each other. But as these strict assumptions are relaxed, an explicit role for financial intermediaries emerges.

The widely offered explanations for the frequent appearance of intermediaries in financial markets are two-fold.[1] The first involves transaction costs. Many authors, beginning with Gurley and Shaw (1960), have highlighted the presence of frictions which can impose a substantial drag on the returns of investors operating independently. By pooling capital across multiple individuals and institutions, the costs associated with assessing and undertaking investments can be shared, thereby enhancing investors' returns.

The second explanation highlighted in the literature builds on information advantages of financial intermediaries. The possibility that an intermediary may have superior information to that of investors has motivated many models. To cite two classic models, Leland and Pyle (1977) argue that intermediaries invest in assets where they have special knowledge, while Diamond (1984) suggests that these financial actors serve as "delegated monitors." The majority of the information-driven models of financial intermediation have focused on the banks. But Chan (1982) and Admati and Pfleiderer (1994) highlight how informational advantages may motivate investors to deploy equity capital through private equity funds.

To be sure, these explanations are not exhaustive. Among the alternative rationales developed in the literature are the ability of intermediaries to shift risk across parties and time

[1] This discussion is drawn from several review articles, including Allen (2001), Allen and Santomero (1998), and Gorton and Winton (2003).

(Merton, 1987), their provision of liquidity to investors whom might have to otherwise inefficiently terminate investments (Diamond and Dybvig, 1983), their role as a bridge between investors with differing beliefs (Coval and Thakor, 2005), and their ability to offer compensation schemes that institutional investors are constrained from offering (Gennaioli, et al., 2012).

At the same time, intermediaries are far from a panacea. A voluminous literature on the behavior of banks during the run-up to the financial crisis has highlighted how agency problems led them to neglect the interests of their capital providers. Mutual funds and insurance companies have been shown to engage in behaviors that benefit portfolio managers at the expense of their investors (e.g., Chevalier and Ellison, 1997; Becker and Ivashina, 2012). On the private equity side, investors have been shown to grow fees at the expense of returns (Kaplan and Schoar, 2005; Lopez-de-Silanes, et al., 2011), invest aggressively at market peaks when expected returns are modest (Axelson, et al., 2012), and exit transactions prematurely to facilitate fundraising (Gompers, 1996). Moreover, many classes of institutional investors appear to sub-optimally choose which private equity groups to invest with (Lerner, et al., 2007; Hochberg and Rauh, 2011).

It is against this theoretical backdrop that the recent interest among institutional investors in investing directly in private equity is particularly noteworthy. Private equity might appear to be a textbook case where the benefits from financial intermediation—in this case, specialized funds—would be substantial: not only are the transaction costs associated with structuring these investments large (for example, see Kaplan and Strömberg, 2003, 2004), but substantial information asymmetries surround the selection, monitoring, and nurturing of the investments, giving rise to potential information advantages for specialized investors. And yet the interest on the part of institutional investors in undertaking direct investments—and thus bypassing

intermediaries—appears to have increased substantially, as numerous news stories (as well as surveys by Coller Capital and Preqin) document.[2]

In this paper, we seek to understand the relative tradeoffs between direct and intermediated investing in private equity. By understanding these issues in this rich context, we aim to enhance our understanding of financial intermediaries more generally. Toward this end, we compile a proprietary dataset of direct investments from seven large institutional investors. For these investors we have *complete* coverage of their direct investments programs, including solo investments and co-investments. Our dataset consists of detailed cash flows for 392 direct investments made by these institutions between 1991 and 2011. To the best of our knowledge, this is the first large-sample study that takes a close look at direct investments in private equity made by institutional investors.

We examine the investing patterns—e.g., timing and geography—as well as the performance of these direct investments. When studying the investment performance, we compare the performance of these investments against the major benchmarks for private equity. We use three metrics of investment performance: 1) returns net of the fees and carried interest paid to general partners; 2) returns net of fees, carry, and the added expenses borne by the limited partners (e.g., internal staff costs); and 3) the market-adjusted returns net of fees and carry.

The key findings of our analysis are as follows:

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[2] E.g., "South Carolina to Start an Investment Firm for Its Private Equity Bets," *http://www.nytimes.com/2010/09/28/business/28carolina.html*, September 27, 2010; "Abu Dhabi Sovereign Wealth Fund Eyes Direct Investment in Indian Real Estate," *http://www.altassets.net/private-equity-news/by-news-type/firm-news/abu-dhabi-sovereign-wealth-fund-eyes-direct-investment-in-indian-real-estate.html*, March 9, 2012; and "NY State: Interested in More Direct Private-Equity Investments," *http://online.wsj.com/article/BT-CO-20120518-713093.html*, May 18, 2012.

- Direct investments are cyclical. As with private equity funds (Kaplan and Schoar, 2005), the most direct funds are invested at times when *ex post* performance is relatively poor. As a result, aggregate performance is better when we undertake a simple average of annual performance than when years are weighted by the amount of capital invested in that year.
- Direct investments generally outperform fund investments. But the strongest finding is that within direct investments, solo transactions, *i.e.*, investments initiated and executed by investors alone, significantly outperform co-investments, which are deals done alongside private equity funds. These results are robust to the use of various benchmarks and lag structures, and provide an economic rationale for the disintermediation trend in private equity investing.
- The impact of years with extensive private equity inflows is less deleterious to the returns of solo investments. While returns are lower, solo investments in peak years significantly outperform co-investments and partnership investments. Nonetheless, the volume of direct investments appears to fall after market peaks.
- The advantages of solo deals over co-investments are greater in setting where information problems are less intense, such as local and later-stage firms that perform less R&D.
- The underperformance of the co-investments appears to be driven by selection ("lemons problem"): institutional investors can only co-invest in deals that are available to them. Opportunities for co-investment are likely to be selected based on deal size. We find that co-investments deals are substantially larger than an average sponsor's deal. We also find evidence consistent with co-investments being exited later than other investments led by the same private equity fund.

As our sample is limited and self-reported, a discussion of the selection bias is in order. We assess the potential selection bias in detail in the Data Section below. But we should point out that, *within* our sample, there is no selection bias; we have the full list of direct investments—solo and co-investments—for the institutions in our sample. This makes the difference between co-investments and solo direct investments a particularly strong result.[3]

Our results illustrate the theoretical literature summarized above in several ways. First, the findings highlight the power of intermediation. While the net returns between direct and partnership investments are similar, because the partnerships charge higher fees, the intermediated investments' gross returns are larger. (We leave the question of whether the fees charged by private equity funds for their services are appropriate outside the scope of this paper.) Second, the analyses highlight the power of intermediation in information-rich environments. The performance of the non-intermediated deals deteriorates sharply in settings where information problems make either deal selection or monitoring more difficult, consistent with the depictions by Leland and Pyle (1977) and Diamond (1984). Finally, the results hint at a complex set of agency problems between intermediaries and the ultimate investors that are not fully captured by most models of financial intermediation: for instance, the tendency of co-investments undertaken by these groups to cluster in the most overheated markets and largest deals.

The rest of the paper is organized as follows. In Section 2, we discuss the economics of direct investing. In Section 3, we present the data set that was assembled for this study. Sections 4 and 5 evaluate the performance differentials between the direct investment sample and several benchmarks. Section 6 concludes the paper.

[3] Anecdotally, insiders in some institutional funds have shared with us that their experiences with solo and co-investments are consistent with our evidence.

2. The economics of direct investments

Traditionally, institutional investors make private equity investments by committing capital to private equity funds. The funds are managed by professional investors (e.g., the Blackstone Group), known as the general partners (GPs). The institutional investors (e.g., South Carolina's pension fund) are known as limited partners (LPs). The general partners are in charge of the entire investing process, from deal selection, execution, monitoring to exiting. The limited partners play a passive role as capital provider. In fact, in many nations, they need to remain passive in order to maintain the limited liability status.

In recent years, there has been an increasing trend for institutional investors to make direct investments, bypassing the GPs as intermediaries. These deals include transactions in which an institutional investor co-invests in a deal that is originated by a general partner (i.e., a PE fund manager) and ones in which the institutional investor originates and invests in alone. In addition, there are hybrid cases where an institution co-leads a deal with a general partner or another institutional investor. Figure 1 depicts different variants of direct investment arrangements. In this paper, we refer to these various types of investments collectively as "direct investments". We use "solo investments" to refer to those deals originated and completed by the LPs on their own, and "co-investments" to refer to deals where LPs invest alongside GPs. The key feature of the latter arrangements (relative to investments by partnerships) is that the LP plays an active role in deciding whether to make the co-investment and typically pays the GPs reduced fees and carried interest, if any.

[FIGURE 1]

Why are LPs increasingly interested in making investments directly? One clear motivation is the high cost of investing in private equity funds. In the traditional LP-GP setting, GPs are compensated through a management fee (typically 1.5 to 2% of committed capital or assets under management) and a "carried interest," a percentage (typically 20%) of the fund's investment profits. This "2-and-20" compensation structure implies a cumulative investment cost of 5 to 7 percentage points per year under a wide range of performance assumptions, a large economic magnitude.

In the years after the private equity boom of 2005 to 2007, the high levels of compensation that private equity fund managers enjoy (Gompers and Lerner, 1999; Metrick and Yasuda, 2010) attracted increasing attention. A growing body of evidence suggests that many private equity LPs do not outperform public market benchmarks (e.g., Kaplan and Schoar (2005), Gottschalg and Phalippou (2009)). While the aggregate performance of private equity over public markets is a subject of debate recently—for differing approaches and conclusions, see for instance Gottschalg and Phalippou (2009), Harris, et al. (2012) and Axelson, et al. (2013)—it is clear that even if private equity outperforms public equity, not all LPs benefit from this outperformance: many of the best returns appear concentrated among funds selected by endowments and foundations, rather than those that dominate the portfolios of banks, insurance companies, and pension funds (Lerner, et al., 2007).

Fees in direct deals are different from the "2-and-20" compensation structure. In direct deals originated by LPs themselves (solo investments), there are typically no fees paid. In the case of co-investments, any fees and carry are negotiated on a deal-by-deal basis. LPs typically resent paying additional charges for transactions originated by fund managers with whom they have invested (see Hoye and Lerner (1996) for an illustrative case). In general, large institutions

(which dominate our sample) have a great deal of market power, and are unlikely to be charged such fees by their GPs. The significant savings on fees and carry in direct investments imply that all else being equal, direct investors should enjoy better net returns.

While cost savings are important, our conversations with institutional investors have suggested that it is not the sole—or, in some cases, even the primary—motivation behind the movement towards direct investing. In the traditional LP-GP setting, GPs are in charge of deal selection as well as the timing of investments, leaving LPs with little control and flexibility. Direct investments give LPs more control. Investors we interviewed point out that the ability to selectively invest in ("cherry pick") deals where the investment opportunities are particularly attractive and where managers can apply sector expertise and active management skills to add value is an important reason for solo investing or co-investing. According to our interviews, some of the institutions pick less than 5% of deals available to them.

In addition, direct investments might give investors a better ability to time the market. This is valuable because private equity funds' performance is highly cyclical (Axelson, et al., 2012; Kaplan and Schoar, 2005). According to the theories on delegated investing, a principal-agency problem may arise in the traditional LP-GP setting. (See, for example, Shleifer and Vishny (1993), which discusses the agency problems in delegated investing; Chevalier and Ellison (1999) and Hong, et al. (2000) provide empirical evidence.) GPs' reputational and career concerns may lead them to "herd" and invest heavily at the peak of the private equity market, when inflows into private equity funds are high, credit is cheap, and all other GPs are heavily investing. This cyclical investing behavior may lead to suboptimal performance, as the investments in peak periods are often entered into at high valuations (Gompers and Lerner, 2000; Axelson, et al., 2012). By investing directly, LPs may circumvent the agency problem in

investing. In particular, LPs may not feel as pressured as GPs do to undertake deals at the peak of the market, and may be better able to invest in "cold" markets when few are investing. Such contrarian investing may lead to superior performance. In our interviews, some of the asset managers had indicated to us that they had suspended their investments relatively early in 2007 and did not start to invest again until 2010.

Direct investments also give the LPs a better ability to customize their risk exposures. Because investors can invest selectively, direct investments offer a much sharper tool to manage targeted risk profiles than fund commitments, where the timing and amount of investments—and hence the risk exposures—are controlled by the private equity fund.

Finally, co-investing may also better align the interests between the LPs and GPs to achieve higher investment quality. GPs can be distracted—for example, by underperforming portfolio companies or plans for some portfolio companies to go public—and thus not be wholly focused on investing during potentially attractive times to deploy capital. In co-investments, because the LPs play a more active role and work closely with the GP, such a principal-agent problem between the GPs and LPs may be reduced.

Direct investments, however, have downsides as well. The biggest challenge is investment skill. In the traditional fund investing, the LPs' main task is to select the right managers. Thus, traditionally LPs' skills should relate to manager selection. But to invest more directly, the LPs need to step into GP-like roles, needing deal-level due diligence, operational, and monitoring capabilities that are not in their traditional skillset. To the extent that the LPs' internal staff is less skilled and/or experienced in transaction-related activities than the GPs, direct investments may on average be of worse quality than portfolio companies in funds.

These concerns might be particularly true for co-investments. In these instances, the LP is typically offered the investment opportunity with only a limited amount of time to undertake due diligence. It might also be the case that in these instances, the greater information of the private equity group relative to that of the LP creates a "lemons problem"—i.e., GPs offer LPs investments in below-average quality deals—which would translate into lower returns.

Reinforcing this type of equilibrium is the fact that the staff of the LPs typically receives lower compensation than investment professionals in funds, reflecting the frequent association of institutional investors with the government or non-profit bodies. Therefore, even if the LPs have talented internal staff to make direct investments, ultimately these promising investors are likely to move to traditional partnerships. If the labor market for investment skills is reasonably efficient, one would expect that direct investments might on average be of worse quality than the portfolio companies chosen by funds. Not only might this lower investment quality offset the gains from reduced fees and carry, it may also negate the other rationales cited by LPs for direct investing, such as "cherry picking the best deals" and "better risk control."

In sum, the different approaches to private equity investing—the traditional intermediated partnerships versus direct investing—present a tradeoff between cost and investment quality. Fund investing is high cost, but the average deal invested by funds may be of higher quality; direct investing is lower cost, but the typical transaction may be of worse quality. The benefit of direct investing, therefore, depends on this tradeoff.

Despite growing interest among LPs to "go direct," no empirical evidence exists on this interesting phenomenon. Do LPs do better with their direct investments than with their fund investments? Within "direct investments", do co-investments (which are generated by the GPs) outperform solo deals (which are generated by the LPs)? One might expect this to be the case if

GPs are more "skilled" in selecting investments and if the higher costs (fees and carry) do not dissipate all the upside. But the opposite may be true if LPs are just as skilled in deal selection or if there are agency costs with co-investing. Our study provides the first analysis of these questions.

3. Data

The data used for the analysis was obtained from seven institutional investors. Getting access to these data posed certain complexities. This information was highly sensitive, and the institutional investors wanted to be sure that neither the individual transactions nor the investors themselves could be identified. This concern necessitated negotiating in each case a data protection agreement. Given these high transaction costs, we focused on eliciting participation from institutions with long-standing direct investment programs (and typically, considerable experience with private equity in general). Thus, it can be anticipated that the participating firms are among the more sophisticated private equity investors in the industry.

Each of the seven contributing investors provided us the *complete* history of their direct investments in private equity. While the groups were generally larger and more sophisticated than the typical LP, we sought to ensure that they were representative in other respects. The investors were based in North America, Europe, and Asia. No more than two groups were from any individual country. They included university, corporate, and government-affiliated entities.

In each case, the institution provided us with two sets of data:

- The first of these was the characteristics of the investments made (date, amount of equity and debt invested, etc.). The total sample contains 392 investments made between 1991 and 2011. In most cases, the firms receiving the funds were identified by name; by two

cases, only by code number. In the former cases, we researched their characteristics at the time of the transaction using CapitalIQ and other business databases. In the latter cases, the institution provided us with the characteristics of the transaction (e.g., industry and headquarters location).

- The second data set consisted of the performance of the investments. This typically consisted of a series of cash flows and valuations for each transaction, running from the time of the investment until either its exit or the time the data was provided (the second or third quarter of 2011). We were able to replicate the performance calculations provided us by the LPs, and resolved any discrepancies through discussions with them. So the differences in performance cannot be attributed to methodological differences.

As any self-reported data, our sample is likely not representative of the direct investments universe. In Table I we evaluate the nature of the reporting bias. Panel A compares basic statistics of the participating institutions in our sample with all others listed in the Thomson VentureXpert Limited Partners Database. It should be noted that even the data compiled in this database are far from an exhaustive depiction of LP activity, reflecting institutional investors' unwillingness to communicate their investment choices and the lack of a statutory requirement for most limited and general partners to reveal fundraising activity (see the discussion in Lerner, et al., 2007, and Hochberg and Rauh, 2011).

The comparison suggests that the private equity programs in our sample are newer and larger than the other LPs in the Thomson database. The average year that a private equity investment program was founded in our sample institutions was 1992, five years after the overall LP universe. On the other hand, total assets under management in mid-2012 averaged $94 billion for our participating institutions, more than double the average size of the investors in the overall

Thomson LP universe. Total alternative assets under management averaged $21 billion among our participating groups, 2.6 times the overall average of $8 billion. The average private equity allocation was also slightly higher among our sample than overall: 15.8% versus 13.2%. Finally, our sample investors on average have 31 fund commitments that have been identified by VentureXpert (their compilations are highly incomplete), more than four times the 7.4 average in the overall LP universe. Thus, overall, our sample represents large institutional investors who are particularly active in alternative investing and have significant private equity exposures.

[TABLE I]

A specific concern for our sample is that investors who collaborated with our study could be more experienced than the average LP in pursuing direct investing. This means that the direct investments in our sample could be better performing than the overall direct investments population. Note that even in the presence of such a selection bias, there are insights that we can learn from comparing solo and co-investments by the *same* investors.

To understand better if our results are generalizable, we first compared the performance (proxied for by exit patterns) of our direct investment sample made by the seven contributing LPs compared to a broader sample of direct investments obtained from Capital IQ made by other LPs. Results are reported in the top half of Table I Panel B. To do this analysis, we first manually identified 150 limited partners from over 6,000 private equity investors appearing in Capital IQ. Then we searched for deals that involve one of these 150 limited partners as a "buyer". In this way, we identified 651 direct investment transactions in Capital IQ. (We do not use this sample for our core analysis because we do not have detailed cash flow data for them; cash-flow data is unique to the proprietary data that we collected. But they can help us at least partially assess the

sample selection bias problem.) We compare the exit outcomes of this sample with our sample.[4] The results show that there are no significant differences in terms of the exit patterns between the direct investments done by our seven LPs and the other LPs, alleviating the sample selection concern that our results might be over-stating the general performance of direct investment programs.

As our main analysis compares direct investments with traditional fund investments by our seven LPs, we also sought to check/validate our overall conclusion by comparing the performance of direct investments made by other LPs identified above with traditional fund investments. This is again to explore whether our results are generalizable. Specifically, we compare the exit patterns of the 651 direct investment deals identified from Capital IQ above to the exit rates of over 20,000 other deals (i.e., traditional PE fund deals) from Capital IQ. Results are reported in the bottom table in Table I, Panel B. This analysis is admittedly crude, but directionally consistent with our main finding: Direct investments appear to perform well, having higher IPO rates (although statistically insignificant) and lower bankruptcy rates (significant at the 10% level). Interestingly, direct investments are also significantly more likely to have a secondary buyout as an exit and exits of unknown types (which tend to be poorly performing) account for a smaller fraction in the direct sample.

4. Results: Performance comparison

In this section, we undertake three sets of univariate comparisons between the performance of direct and partnership investments: First, we undertake the baseline comparison of the performance net of fees and carried interest. Second, we examine the performance

[4] Exit data was generously provided by Per Strömberg, and is used in Strömberg (2008). We supplemented this by manual searches of recent exits.

adjusted as well for the estimated internal costs of managing the programs. In a third comparison, we look at performance adjusted for the contemporaneous returns of public equity markets.

A. Net Performance

The distribution of 392 direct investments in our sample is presented in Table II. The investments are significant in magnitude, totaling nearly 23 billion dollars. Roughly 73% of the sample by the number of deals and 61% by the overall amount invested are co-investments. (Of course, this only represents the activity of seven large investors.) By way of comparison, over the same period from the beginning of 1991 and the third quarter of 2011, LPs' total commitment to private equity funds globally was $1.6 trillion, again as estimated by Thomson Reuters.

As Figure 2 shows, the majority of the direct investments in our sample are concentrated in the most recent period. Thus, direct investing represents still a small, but a meaningful and growing, part of institutional investors' total private equity investing. One striking pattern is the manner in which the number, and especially the dollar volume of investments appears to crest around years that are among the peak of private equity investing more generally, particularly in 2007.

[TABLE II & FIGURE 2]

We focus on two measures of performance: the ratio of total value, which is the sum of distributed and residual capital, to the amount paid into the fund (abbreviated TV/PI) and the internal rate of return, or IRR. We focus on these measures, as most published performance benchmarks for private equity funds employ these metrics. These measures have significant limitations, including not adjusting for the risk of the investments. However, in this paper we will be focusing on the differences between performance of the investments in our sample and

the benchmarks. Thus, we implicitly assume that the leverage and other risk measures for transactions in our sample are comparable to that of the benchmarks. (Where possible, we will match the benchmarks by type of investments and geography.)

Two patterns are apparent in the performance data reported in Table II. First, because the direct investments are concentrated in years with relatively lower performance—again, similar to commitments to and investments by private equity partnerships—the performance of direct investments are considerably better when years are equal weighted than when they are weighted by the amount invested. For example, for solo investments, TV/PI goes down from an equal-weighted average of 3.98 across the years to 3.08 when weighted by amount invested; IRR goes down from 30.17% to 16.82%.

A second pattern is the disparity of performance between solo and co-investments: the solo investments made by LPs on their own perform substantially better than co-investments with GPs. While investment-weighted mean TV/PI and IRR are 3.08 and 16.82% for solo investments, they are 1.20 and -0.09% for co-investments. The poor performance of co-investments appears to be highly related to the "hotness" of the PE market, measured by total fund commitments. In unreported analysis, we find that while the correlation between TV/PI of solo investments and total fund commitments is -0.18, while it is -0.59 for co-investments. Using IRRs as the performance metric, the correlation with total fund commitments is -0.04 for solo investments and -0.51 for co-investments.[5] Thus it is safe to conclude that the under-performance of co-investments is particularly related to the well-documented cyclicality of PE performance.

[5] The same conclusion holds if we use total PE fund disbursements as a measure of PE market "hotness". For instance, the correlation between TV/PI and fund disbursements for solo deals is -25%, but it is -67% for co-investments.

An important difference between direct investing and traditional private equity investing is the absence of a fund structure. Typical performance measures such as those provided by Thomson VentureEconomics, Preqin, and Burgiss (which we use later to benchmark our results) use fund, or portfolio performance, whereas in our direct investment sample each investment is treated individually. Given that we look at capital-weighted averages this does not make a difference for TV/PI. But this does affect the IRR calculation: the IRR of a portfolio is not the value-weighted IRR of its investments. Thus we also calculate pseudo "portfolio IRRs" for our direct investments. This is done by treating investments initiated in the same year by the same investor as one portfolio regardless of the year of any follow-on investments. The last vertical panel of Table II reports these "portfolio IRRs". Once we weight these annual portfolio IRRs by amount invested, we again observe the under-performance of co-investments (average portfolio IRR is 9.68%) relative to solo-investments (average portfolio IRR of 14.58%).

To compare the performance of the investors in our data-set to those of investments in private equity partnerships, we use three major benchmarks of private equity partnership performance: Preqin, Thomson VentureXpert, and Burgiss. Which of these benchmarks accurately reflect the private equity industry as a whole is a controversial issue (see the discussion in Harris, et al., 2011). Rather than designating one benchmark as the best, we sought to use all three.

We obtained the three benchmarks for funds closed in each vintage year, for each distinct geographic region reported (typically the U.S. and all other, or else the U.S., Europe, and all other) and deal type (venture capital or buyout). We compute these benchmarks through September 30, 2011 to most closely match the data we received from our LPs. For each data

source and for each vintage year, we downloaded the unweighted and capital-weighted average rate of return (IRR) and unweighted and capital-weighted average investment multiple (TV/PI).

One important feature of the data is summarized in Figure 3. The benchmarks computed by Preqin, Thomson, and Burgiss are reported net of fees and carried interest (profit sharing) paid to the general partners. The direct investment returns were also universally provided to us on a net basis, that is, less any transaction fees and carried interest charged by the GPs. So, our first comparison is of the net returns to the LPs (the third line of Figure 3).

[FIGURE 3]

A subtle issue of timing arises when we construct benchmarks. For the direct deals, we have the dates when the transactions were undertaken. The year of the direct deals, such as in Table II, corresponds to the actual year of the investment. The performance of private equity partnerships, however, is compiled by the major data vendors using the date of closing of the fund. Private equity partnerships do not typically invest all their capital in the year that they close, but instead the funds are invested in the several years thereafter. To deal with this issue, we compare the performance of the direct deals to funds raised in the same year as the transaction ("Lag 0"), as well as funds raised one and two years ("Lag 1" and "Lag 2") before the direct investment was made. Overall, however, our findings are robust to the timing of the benchmark.

Table III provides an illustration of how a single data source (in this case, Preqin) can yield multiple benchmarks. The benchmark can be computed using all private equity (e.g., venture capital, buyouts, and intermediate transactions) or just buyouts. Another permutation is to use only U.S. funds, or those worldwide. A simple average can be taken across years, or the data weighted by the amount invested. (As with the direct investments, weighted fund returns are

substantially lower.) Finally, as mentioned earlier, various lags can be taken, to address the timing issues discussed in the paragraph above.

[TABLE III]

Table IV presents differences in performance between the direct investment sample and the various benchmarks. Each number reported in Table IV corresponds to a difference between the average performance in our sample and a benchmark. Panel A shows results for the TV/PI comparison, and Panel B shows results for IRR. Shaded cells denote cases where the direct investments outperform the benchmarks.

Table IV indicates that the solo direct investments outperform *any* market benchmark. For TV/PI, the direct investments' outperformance ranges from 2.1 to 2.5 of the money paid in on an unweighted basis, and 1.6 and 1.8 of the money paid in when weighted by capital invested/funds raised in a given year. For IRR, the outperformance is between 13% and 19% for a simple average, and 7% and 10% for a weighted average. Though not reported, using the differences between capital-weighted average IRRs and portfolio IRRs from Table II, one can easily conclude that the outperformance of solo deals relative to benchmarks is robust to using either methodology to compute IRRs. For example, the investment-weighted portfolio IRR for solo deals is 14.58%, 2% lower than capital-weighted average IRR (16.82%). The outperformance for solo deals over benchmarks, which is roughly 9%, will easily survive this difference.

When it comes to co-investments, the picture is more mixed. Given that 288 deals (out of 392) in our sample are co-investments, the mixed results are also reflected in the overall sample. For TV/PI, the unweighted co-investments outperform the Thomson benchmark (which Stücke (2011) argues is biased downwards); and the unweighted IRR consistently outperforms all

benchmarks. However, the weighted results show consistent underperformance of co-investments.

In general, when the results are weighted, the results are more consistent across different benchmarks. Solo investments outperform the market benchmark, but co-investments underperform.

[TABLE IV]

B. "Net-Net Performance"

The return metrics studied in the previous sub-section did not net out the LPs' internal costs of running the investment programs. In particular, it might be anticipated that the staff salary and bonus costs incurred per unit of capital in direct investments would be greater than those associated with a similar-sized partnership investment. The reason is that direct investments require greater due diligence, more intensive structuring, and ongoing monitoring. The legal costs may also be greater.

Several of the institutional investors in our study provided us with detailed data on their costs of managing direct and partnership investment programs. These data allowed us to undertake a second calculation, which might be termed a "net-net" comparison of performance, *i.e.*, an assessment of performance after considering all costs. (This comparison is depicted on the bottom line of the first panel of Figure 3).

In particular, we received internal cost data (or at least estimates) from four of our institutional investors. The estimates from all four were tightly bunched: The mean annual internal cost for investing in private equity partnerships was 0.11% of committed capital, and the mean annual cost of direct investing was 0.91% of committed capital. As we expected, investors' internal cost of running direct investments was much higher than the cost of investing in funds.

In order to calculate "net-net" returns on direct investments, we assumed that these costs were incurred over five years. We based this assumption on the estimates provided by institutional investors in our sample.[6] For LPs' investments in private equity funds, we assume the annual 0.11% internal cost will be incurred over five years, which is based on the unpublished tabulations of the estimated duration of investments in funds by Stücke (2012).

For multiples (TV/PI), this adjustment involved subtracting 0.0055 (=5*0.0011) or 0.0455 (=5*0.0091) from the multiples for partnership and direct deals respectively. For the more recent deals, we pro-rate the discount to account for the shorter horizon. For IRR, in cases where we have cash flow data, we adjust the numbers accordingly and re-compute the IRR. In cases where we do not have cash flow data, we estimate the impact by first approximating a cash flow stream that maps to the IRR number (making assumptions based on the data in Robinson and Sensoy (2011) and then looking at the consequences of the added fee.

Table V presents the "net-net" comparisons. The subtraction of the larger fees for direct investments naturally reduces the difference in performance between our sample and the benchmarks. However, the basic conclusion from these comparisons is the same as in the previous sub-section. Strikingly, even after subtracting the larger internal cost of running direct programs, direct investments still generally out-perform fund investments. The out-performance is particularly strong among solo deals, while co-investments tend to under-perform fund investments using various benchmarks. These patterns are true whether the results are equally weighted or value weighted.

[TABLE V]

[6] Strömberg (2008) concluded that the average holding period for exited deals by private equity partnerships was 49 months. For obvious reasons, the use of a five-year horizon produces more conservative estimates of differential performance of the direct investments. The overall conclusions in this paper are qualitatively unaffected by using the Strömberg estimate.

C. Market-Adjusted Net Returns

We now turn again to a comparison of performance net of fees and carry, as in Section A. However, now we look at the performance of both the funds and the benchmarks net of the public market return.

Our rationale for examining market-adjusted returns is based on the work of Robinson and Sensoy (2011). These authors argue that even though the absolute returns of private equity partnership investments in peak years is lower, the returns in these years relative to public market benchmarks do not differ significantly. This distinction is important, they argue, because of the way in which institutional investors make investment decisions. In particular, institutions frequently have a target amount reserved for investments in equities, whether public or private. The returns of public and private equities are often highly correlated. Thus, the poor performance of private equity during years with large numbers of investments may be not as damaging, because the public market investments would be reduced by a corresponding amount. In other words, for every dollar invested in direct investments, there is one less dollar invested in public equities.

We have seen above that direct investments are also concentrated around market peaks. If in a similar manner to the partnership investments, these investments are offset by reductions in public market investments, the deleterious of such timing may be reduced. (Indeed, Lerner, et al. (2013) presents an example of an institution that explicitly reduces public equity holdings when making direct private investments.) Thus, even though direct investments are concentrated at market peaks, their impact on overall performance may be less harmful than initially appears because the funding for them reduces the allocation for public equities.

One way to empirically address this concern is to examine market-adjusted performance. In particular, we repeat the analysis in Section 4.A, reducing the returns of both the direct investments and the corresponding private equity benchmarks by the performance of the public markets over the same period. The choice of market index depends on whether the deal in question is a venture capital investment or a buyout, and whether it is a U.S. or global deal. For U.S. buyout, we use the S&P 500 index; for U.S. venture, we use the Russell 2000. For non-U.S. buyout and venture, we use MSCI EAFE Standard and Small Cap indices respectively. The adjustment factor is contemporaneous to the year of the direct investment when we use lagged benchmarks.[7]

To calculate the adjustment, as in Section 4.B, we assume a holding period of five years for both the direct investments and the partnerships. The time period over which the benchmark is calculated for the partnership investments is from July 1 of the vintage year for a period of five years, again following Stücke (2012). The procedure for the direct deals is similar. For year where the period of five years exceeded the cut-off date for the index data, we used the index through the end date of the return series. For example, U.S. buyout funds in 2003 (using Preqin data) have an IRR of 23.3% and a multiple of 1.95. Direct buyout deals have a return of 28.06% and a multiple of 2.05. We look at returns on S&P 500 and find a five year annualized return of 5.52% and a total multiple of 1.31. Thus, the market-adjusted numbers for the funds are 17.78% (=23.3%-5.52%) and 0.64 (=1.95- 1.31); for the direct deals, 22.54% (=28.06% - 5.52%) and 0.74 (=2.05 - 1.31).

[7] This is because the implied year of the investment is the same as the year of the direct investment sample, regardless of the lag. Although the market adjustment itself does not move regardless of the lag, the weights in the analyses change due to the lags.

The reported results correspond to difference in capital-weighted averages. Recall that the adjustment essentially controls for the uneven distribution of performance and investment. Had we done a market-adjusted calculation using unweighted data, the results would essentially be equivalent to those in the left-hand columns of Table IV.

The results in Table VI show a similar picture to the earlier tables. Solo deals continue to outperform the relevant benchmarks, while co-investments lag in performance, particularly when we examine the IRR.

[TABLE VI]

5. Results: Sources of Performance Differences

To better understand the drivers of the performance differences, we conduct multivariate regression analyses of the performance difference between direct investments and their *deal-matched* benchmarks. In particular, we match each transaction to the most appropriate industry and deal type (stage, geography, and year) benchmark. In this way, we sought to understand which direct investments performed particularly well.

We first perform a simple assessment of the performance. The results are reported in Table VII. The dependent variable is the performance difference between direct investments and the most comparable private equity fund benchmark. For non-U.S. deals, we are missing many of the benchmarks: for instance, benchmarks by stage of deal are frequently missing from the commercial data sources. So for each deal, we compute a benchmark in one of two ways. First, we compute the returns net of (i) the aggregate index for private equity returns of funds of that investment type, regardless of geography, as well as (ii) the aggregate index for private equity returns of funds of that region, regardless of investment type. These two sets of corrections are denoted as “Investment type” and “Region.”

Because the matching of the benchmark is at the deal level, these numbers are not directly comparable to the ones reported in Tables IV through VI. We report in each case the benchmark with a one- and two- year lags. In addition to a constant, the specification includes a dummy variable indicating that a deal is a solo investment (as opposed to a co-investment). The standard errors are clustered by investor (that is, in seven clusters).

Consistent with the non-parametric results, Table VII indicates that solo investments invariably perform better than the co-investments. The performance differentials are statistically and economically significant in magnitude: the TV/PI multiple is higher by about 4 and IRR is higher by about 13-15 percentage points. The constant term, which estimates the mean outperformance of all direct investments relative to their deal-specific benchmarks, is never significant using TV/PI and always significantly negative using IRR, implying that co-investments underperform traditional private equity investments. (The results for benchmarks matched on investment type and region are nearly identical. In the subsequent analyses, we only focus on the investment type benchmark.)

We do not observe the set of investments available for co-investments and therefore cannot directly rule out LPs' lack of skill in selecting co-investments. However, the fact that the same LPs outperform the private equity fund benchmarks in their solo investments suggests that co-investments suffer from either insufficient time and/or other resources to conduct due-diligence (investments demand) or else a "lemons problem" (investments supply).

[TABLE VII]

As discussed in Section 2, the outperformance of solo direct investments could be consistent with a series of non-mutually exclusive explanations. In Table VIII, we examine the relative performance of investments in venture deals, which constitute 14% of our sample, as

well as targets in high research and development (R&D) industries. Venture deals are often seen as intrinsically riskier than buyouts and potentially require higher active management skills. The first two specifications for each benchmark appearing in Table VIII indicate that not only co-investments, but also solo investments in venture deals, underperform the portfolio benchmark. The analysis includes fixed effects for the investor, year, and the target's industry.

The second set of specifications reported in Table VIII examines information costs of direct investments, as proxied for by R&D expenses scaled by assets. Industries with high R&D expenses are likely to be associated with high due diligence and monitoring costs. Similar to venture deals, investment in such industries may require more active management. We find that solo investments substantially underperform in industries that face higher information cost (higher R&D/Assets). This qualitative result holds for both TV/PI and IRR, but is statistically significant only for IRR. Together with the results for venture (as well as that for proximate deals below), this finding suggests limits to the ability of LPs to generate value in direct investments. In particular, the outperformance of solo investments seems limited to settings where information costs are not too great. In more opaque settings, the difficulties of either investment screening or active managing/monitoring seem to reduce their ability to add value.

[TABLE VIII]

In Table IX, we use the proximity between the institutional investor and the investment target—measured in hundreds of kilometers—as another proxy for information cost/familiarity with the target company. We find that distance between the investor and the target firm negatively impacts the investment performance of solo deals. While the distance variable alone is not significant, its interaction with the solo dummy is consistently negative and statistically significant for TV/PI regressions, indicating that solo-investments made in targets far away from

the institutional investors' location perform worse, all else equal. This finding is consistent with the notion that there is a role for private, local information when making direct investments, and that investing and deal monitoring becomes less effective when distance increases (for similar evidence from public markets, see Coval and Moskowitz, 2001).

Collectively, our evidence on venture deals, higher R&D industries, and proximity leads to a consistent conclusion: while solo investments generally outperform benchmarks (and co-investments), investors' ability to outperform is curtailed for situations where information cost is high. This conclusion is consistent with the information advantage argument often offered for using financial intermediaries (in this setting, professions PE fund managers).

[TABLE IX]

In Table X, we focus on our LPs' ability to time the market. Earlier analysis included year fixed effects, which absorb any timing differences. Timing skills and investment skills (either in investment picking or active management) are not mutually exclusive; but it is well known that poor investment timing is a main driver of under-performance in private equity. To measure timing ability, we add indicator variables for peak years of the private equity cycle (1998 to 2000 and 2005 to 2007). As in earlier tables, given that outperformance is manifested in solo direct investments, we also include interaction terms between the solo indicator and the peak year dummies.

We find that the peak year dummy itself does not affect the relative performance of direct investments relative to benchmarks. However, the out-performance of solo deals over co-investments is particularly pronounced in peak years, which is when private equity funds perform particularly poorly (Kaplan and Schoar, 2005). The interaction between the solo dummy and the peak year dummy is statistically significant throughout the TV/PI and the IRR

regressions. For IRR results, the outperformance of direct investments is only statistically significant for the peak years. This result indicates that the normally deleterious effect of poor investment timing on performance is much less severe for investors' solo transactions than for their co-investments. This supports LP's claims that direct investments offer more flexible timing of the PE market.

[TABLE X]

Finally, we focus on co-investments and explore potential sources of their underperformance. One of the most striking and also intriguing finding of this paper is that the *same* LPs can out-perform private equity benchmarks in their solo investments yet they underperform in their co-investments. This suggests that the under-performance is probably not due to poor investment skill (lack of good investment professionals). Instead, this suggests that either LPs are time and resource-constrained when it comes to co-investments, or there are other agency costs with co-investments. For example, our analysis on timing above indicates that co-investments under-perform the most during "peak" years when fund commitment and investment pace in private equity is high in general. This can happen not only because in peak years more co-investments are done,[8] but also if the deals offered to the LPs by the GPs are of poor quality (a "lemons" problem). In this section, we want to understand better the role of selection effects: which deals become available to limited partners for co-investments? And does that help explain the poor performance? For five of the investors in our sample we know the identity of the sponsors (the general partner leading the investment). Thus, we can compare these transactions with the broader sample of the sponsor's investments.

[8] Graphically, Figure 2 illustrates that more co-investments are indeed done in peak years.

Co-investments typically are done through a separate investment vehicle alongside the traditional private equity fund investment. So we match co-investments in our sample to the corresponding fund that invested in the same deal and compare the performance of the deal to the performance of the fund as a whole from Pitchbook, Preqin and other sources. We are able to identify 73 co-investments where we know the performance of the associated fund. These transactions have 114 fund matches because of "club deals," or transactions with multiple sponsors.

The first thing to note it that deals with co-investments are substantially larger than a typical deal in the GP's portfolio. Table XI compares the typical co-investment—with a mean enterprise value of $2,692 million—with the GPs' other deals as identified in CapitalIQ. (We restrict the comparison to transactions done two, three, and five years before the transaction to ensure comparability.) Each of the differences reported is statistically significant, and the difference is economically meaningful as well: on average, co-investments' enterprise value is nearly three times larger than the median contemporaneous deal done by the same GP. The large size discrepancy between deals with co-investments and GP's other investments indicates that there is selection on the GP's side: LPs are invited to co-invest when GPs need extra capital.

To understand whether these deals as attractive as the other transactions undertaken by the fund, we look at their ex-post performance as compared to that of the fund. The results are shown in Figure 4. On average, IRRs of investments chosen for co-investments are more than 8% lower than the overall fund performance, a difference which is significant at the five percent confidence level.[9] The difference for TV/PI however is not economically or statistically significant. Put together, if performance is used as an ex-post (and imperfect) measure of deal

[9] The difference is understated, since the fund performance is not net of the deal where the co-investment was made.

quality, the result does indicate that co-investments are of lower quality; in particular, although these investments may generate the same cash multiples as the funds, they take longer to exit (and hence have significantly lower IRR).[10]

[TABLE XI & FIGURE 4]

6. Concluding remarks

The impact of financial intermediation has been a subject of considerable examination in the finance literature. On the one hand, these middlemen should be able overcome transaction cost and information problems; on the other, they may be prone to agency conflicts which affect their performance.

The theoretical literature on intermediation motivated this analysis, which focuses on the private equity setting, where disintermediation has become increasingly common. Using proprietary data compiled for this study, this paper offer the first large sample evidence of the relative performance of direct investments by large institutional investors. Our sample includes 392 deals by a set of institutions, both co-investments and direct investments, covering over twenty years. We find robust evidence of the outperformance for the solo direct investments in our sample. However, the same investors show mixed results in their co-investment deals. We find that outperformance of solo direct investments is due in part to their ability to exploit information advantages by investing locally and in settings where information problems are not too great, as well as to their relative outperformance during market peaks. The underperformance of co-investments appears to be associated with the higher risk of deals available for co-investments.

[10] Lopez-de-Silanes, et al. (2010) also provide evidence that deals that take longer to exit typically have the same return multiple as quick exits, but have significantly lower IRR.

Our findings—as striking as they are—must be interpreted cautiously for several reasons. First, it is not clear whether this result is a reflection of the fact that our sample consists of large and sophisticated investors: small investors replicating a direct investment strategy may have different experiences. Even though we tried to assess the sample selection bias, there is a risk of over-generalizing our result. Nor is it clear whether returns on direct investment deals will continue to be as successful as institutional investors expand their direct investment programs.

These limitations notwithstanding, the sharp contrast between the performance of solo deals and that of co-investment deals indicate that there can be an agency problem when general partners selectively offer deals to limited partners for co-investing. One question that arises is whether repeated investment relationships between the LPs and the GPs, and hence the reputational risk that GPs have vis-à-vis the LPs, helps mitigate this agency problem. To fully assess this important question, more data and experience with direct investments is needed, which we leave for future research.

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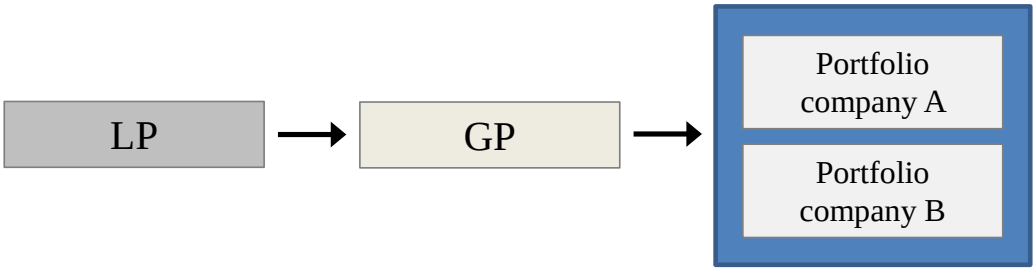
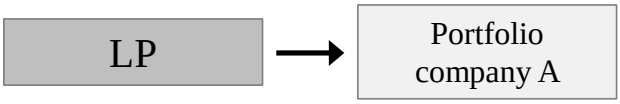
Figure 1
Different forms of private equity investing

A. Traditional fund investing



B. Direct investing



C. Co-investing

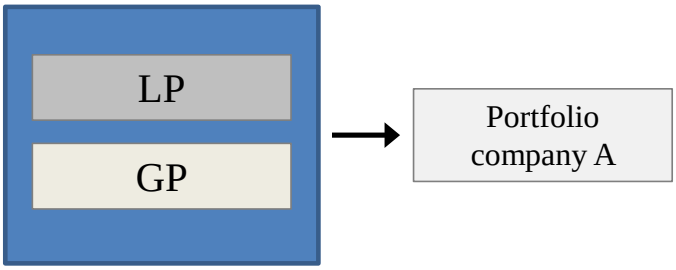


Figure 2
Direct investments over time

This figure plots the amount of direct investments (solo investments and co-investments) in our sample over time. We use all PE fund raised globally as a benchmark for direct investment amounts. The benchmark is from Preqin.

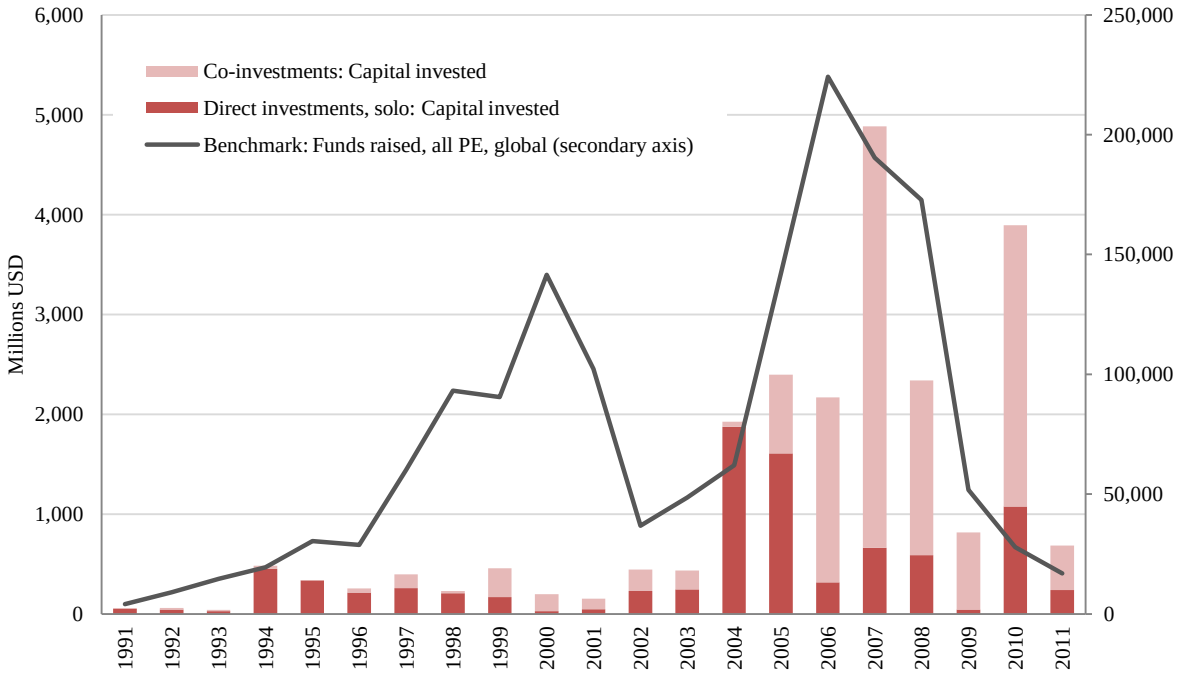


Figure 3
Alternative performance measures

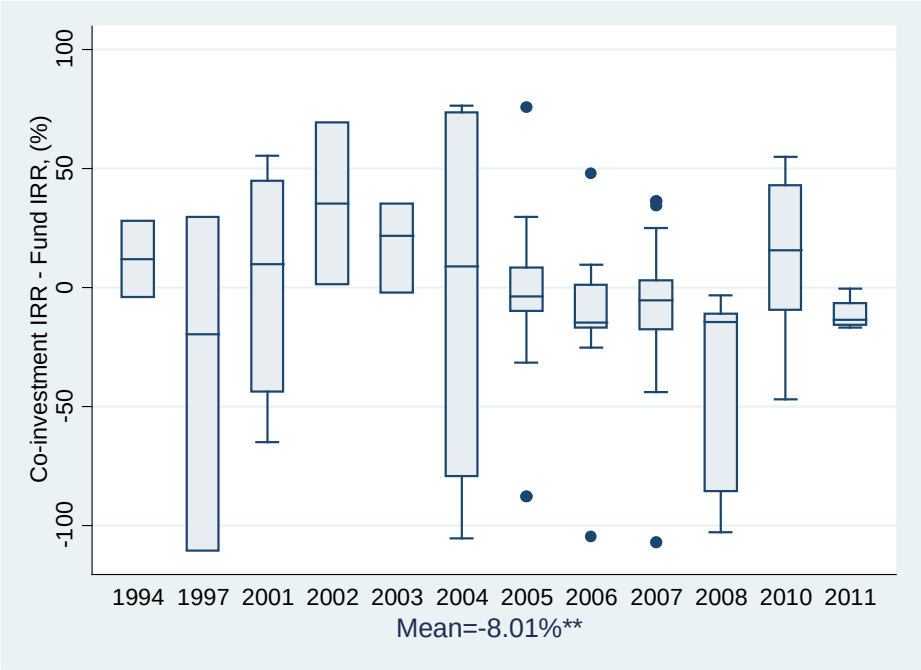
Traditional partnership investment:	Direct investment:
Gross return	
- Fee	- Fee (different structure than in traditional investment)
= Net return (Venture Economics, Preqin, and Burgiss)	**= Net return** (Our data)
- Administrative cost (0.11% of committed capital incurred annually up to 5 years)	- In-house investment cost and administration costs (0.91% of committed capital incurred annually up to 5 years)
= Imputed net return ("net-net")	

Market adjustment (capital-weighted performance only):

Net return (Venture Economics, Preqin, and Burgiss)	**Net return** (Our data)
- Return of public markets over typical fund duration (5 years) (For U.S. buyouts, we use S&P 500 index. For U.S. venture, we use Russell 2000 index. For global buyout, we use MSCI Standard index. For global venture, we use MSCI Small Cap index.)	- Return of public markets over typical investment duration (5 years) (For U.S. buyouts, we use S&P 500 index. For U.S. venture, we use Russell 2000 index. For global buyout, we use MSCI Standard index. For global venture, we use MSCI Small Cap index.)
= Market-adjusted net return	

Figure 4
Co-investments vs. fund performance by year of investment

Where possible we match co-investments in our sample to the corresponding fund. (Co-investments typically are done through a separate investment vehicle alongside the traditional private equity fund investment.) The sample has 73 co-investments and 114 fund matches due to transactions with multiple sponsors. The figure plots distribution of differences in performance between co-investments and the corresponding fund. Data for the funds is compiled from Preqin. This is the standard box plot: the band inside the box corresponds to the median, bottom and top of the box are the first and third quartile, dots are the adjoin values. ** indicates statistical significance at the 5% level.



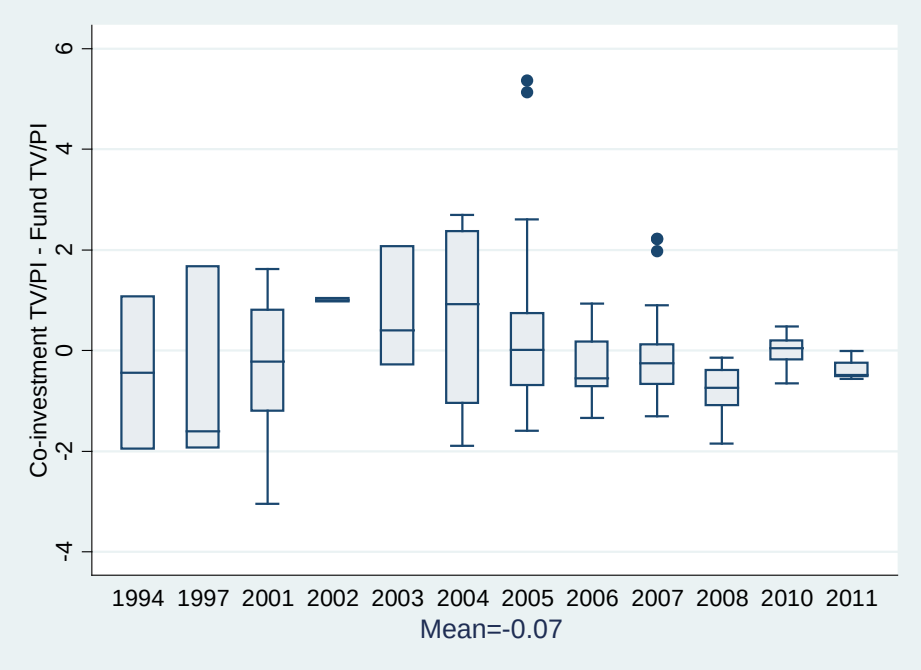


Table I
Sample characteristics and evaluation of the selection bias

Panel A compares basic statistics of the participating institutions in our sample with all others listed in the Thomson VentureXpert Limited Partners Database. Panel B evaluated our sample based on exit information. We manually identified out-of-sample limited partners and the direct investment they made from Capital IQ. Initial public offering (IPO), trade sale, secondary buyout, and bankruptcy are different exit types. "All exits" includes confirmed exits with unknown type. ***, **, and * indicates statistical significance at the 1%, 5%, and 10% level, respectively.

Panel A: Sample characteristics

	Mean (7 Investors in our sample)	Mean Other LPs (873 investors)
Private Equity Program Founded	1991.6	1986.1
Total Assets Under Management (US$B)	94.4	44.3
Total Alternative Assets Under Management (US$B)	20.6	7.9
Private Equity (as a % of Assets under Management)	15.8	13.2
Total Identified PE Fund Commitments (Number)	31.3	7.4

Panel B: Exit information

	In sample LPs	Out of sample LPs	Diff. *t*-stat	
IPO	23.8%	23.9%	-0.01	
Trade sale	66.7%	57.5%	0.79	
Secondary buyout	0%	5.2%	-1.07	
Bankruptcy	0%	6.0%	-1.15	
Unknown exits	9.5%	7.5%	0.33	

	Direct investments	Non-direct investments	Diff *t*-stat	
IPO	17%	13%	1.56	
Trade sale	42%	47%	-1.62	
Secondary buyout	27%	16%	4.43	***
Bankruptcy	4%	7%	1.84	*
All exits	11%	17%	-2.44	**

Table II
Direct investments and co-investments performance (by year of investment), 1991-2011

This table shows performance of the direct investments by year. *All* corresponds to the full sample of direct investments. *Solo* and *Co-inv.* correspond to the independent direct investments and co-investments sub-samples, respectively. TV/PI is the total value (sum of distributed and residual capital) divided by paid in capital. We calculate the capital-weighted average TV/PI for investments done in a given year for each investor; the reported numbers are the simple averages across investors. *IRR* corresponds to value-weighted average IRR for investments done in a given year for each investor. *Portfolio IRR* treats all investments done by the same investor in a given year as one portfolio (regardless of the date of other cash flows). Both set of IRR numbers correspond to the simple average across investors in our sample. For seven (out of 392) investments we do not have cash flows data, but only the IRR, we include these as separate observations in computing the portfolio IRR.

Deal year	Number of transactions			Total capital invested ($million USD)			TV/PI			IRR (%)			Portfolio IRR (%)		
	All	Solo	Co-inv.	All	Solo	Co-inv.	All	Solo	Co-inv.	All	Solo	Co-inv.	All	Solo	Co-inv.
1991	4	4	0	54.31	54.31	0.00	0.75	0.75	--	-25.87	-25.87	--	-4.51	-4.51	--
1992	6	4	2	60.70	43.31	17.38	2.91	3.08	2.56	22.27	21.41	24.00	29.02	31.64	23.91
1993	6	4	2	38.72	26.58	12.14	2.54	2.29	3.03	89.26	52.18	163.43	36.93	29.66	107.60
1994	10	7	3	483.25	450.26	32.99	2.32	2.23	2.52	23.78	23.65	24.08	29.88	29.21	27.26
1995	9	8	1	336.11	335.01	1.10	1.73	1.63	2.56	16.69	16.55	17.80	16.60	16.45	16.90
1996	19	9	10	255.39	212.59	42.80	2.26	3.50	1.14	70.00	65.93	73.67	31.36	103.71	-20.25
1997	20	9	11	397.27	259.49	137.78	15.27	32.57	1.12	-11.77	3.26	-22.70	18.30	19.70	10.58
1998	11	8	3	230.14	206.71	23.42	11.50	14.06	1.26	-19.05	-25.82	4.62	13.87	-4.48	14.44
1999	13	5	8	457.93	167.60	290.33	2.06	1.86	2.19	15.95	-1.38	26.77	15.35	15.50	30.07
2000	10	2	8	195.92	26.17	169.75	0.71	0.89	0.67	53.78	388.23	-29.83	-18.17	-100.00	-15.67
2001	10	1	9	151.09	47.90	103.19	1.41	2.80	1.26	0.99	28.53	-2.07	23.39	27.84	18.46
2002	12	2	10	442.57	227.80	214.77	2.27	2.41	2.24	32.78	69.75	25.39	46.73	106.55	40.73
2003	13	4	9	433.80	243.80	190.00	2.05	2.58	1.81	28.06	33.62	25.59	40.64	48.93	49.95
2004	12	7	5	1,925.30	1,874.30	51.00	2.51	2.83	2.07	34.40	57.63	1.88	43.72	30.79	70.11
2005	35	7	28	2,397.07	1,608.70	788.37	1.91	1.59	1.98	25.38	8.72	29.70	17.31	6.12	14.99
2006	41	2	39	2,169.19	316.00	1,853.19	1.15	0.61	1.18	-11.47	-47.16	-9.54	0.24	-18.28	0.31
2007	59	3	56	4,884.07	662.00	4,222.07	1.13	1.59	1.10	-9.09	-18.29	-8.60	4.18	13.64	1.75
2008	27	2	25	2,339.13	589.30	1,749.83	0.74	0.31	0.78	-26.85	-43.00	-25.56	-22.09	-66.67	-11.90
2009	16	2	14	815.17	44.70	770.47	1.20	0.91	1.24	21.97	-15.25	27.70	53.58	26.81	53.03
2010	41	10	31	3,893.04	1,075.40	2,817.64	1.17	1.15	1.18	12.38	10.70	12.93	18.90	6.01	20.35
2011	18	4	14	685.49	238.60	446.89	1.01	1.00	1.01	1.70	4.24	0.98	22.55	14.18	21.74
Total:	392	104	288	22,645.68	8,710.55	13,935.13	--	--	--	--	--	--	--	--	--
Simple average, 1991-2010							2.88	3.98	1.68	17.18	30.17	18.91	19.76	15.93	23.82
Weighted average (by capital invested in the year)							1.78	3.08	1.20	6.15	16.82	-0.09	13.61	14.58	9.68

Table III
Example of benchmark performance data, Preqin

This table showcases one of the three samples used as a performance benchmark. The reported benchmark is from Preqin and corresponds to cumulative performance as of September 30, 2011 by fund vintage year. Deals invested in 2011 are excluded from the benchmark calculation.

Panel A: U.S. market, Preqin

Fund vintage	All private equity deals				Buyouts			
	Number of transactions	PE funds raised ($million USD)	Capital-weighted TV/PI	Capital-weighted IRR (%)	Number of transactions	Total capital invested ($million USD)	Capital-weighted TV/PI	Capital-weighted IRR (%)
1989	62	10,093.89	2.79	27.1	8	5,878.12	3.17	33.7
1990	43	5,304.46	2.60	24.4	9	2,652.26	3.04	24.7
1991	27	2,252.97	2.97	28.2	5	1,252.00	3.34	33.2
1992	46	8,077.33	2.67	33.1	12	4,566.14	2.65	44.9
1993	57	13,417.55	2.94	24.8	13	9,295.50	2.44	20.2
1994	58	16,001.87	2.59	25.4	18	10,855.95	1.72	22.0
1995	69	26,426.46	2.31	22.0	16	18,913.27	1.66	14.1
1996	73	21,041.15	1.83	11.8	10	11,451.85	1.59	9.5
1997	83	46,749.60	1.91	20.0	22	31,638.01	1.59	9.5
1998	95	77,925.18	1.41	7.5	30	50,943.35	1.22	1.0
1999	101	70,128.44	1.28	4.2	20	30,113.15	1.56	8.2
2000	160	117,110.24	1.41	8.6	41	57,705.62	1.63	13.6
2001	108	74,052.15	1.65	15.9	14	27,862.93	2.19	30.5
2002	75	22,673.02	1.63	17.3	14	11,568.34	1.82	19.2
2003	81	38,406.41	1.70	17.0	18	25,148.56	1.95	23.3
2004	118	41,996.17	1.43	10.8	18	22,267.86	1.64	14.9
2005	149	87,122.97	1.27	6.0	39	62,063.36	1.33	7.2
2006	183	147,631.18	1.07	1.8	45	94,773.99	1.03	1.0
2007	215	153,219.46	1.11	4.1	41	108,370.01	1.14	5.2
2008	169	115,891.57	1.16	8.2	36	72,140.57	1.12	6.8
2009	67	38,731.65	1.16	n/m	9	16,514.00	1.14	n/m
2010	90	24,089.98	1.02	n/m	21	9,927.83	0.95	n/m
2011	61	16,623.98	0.87	n/m	11	14,534.30	0.80	n/m
Total (1991-2011):	2,085	1,159,569.33	--	--	453	691,906.57	--	--
Benchmark:								
1991-2010 (contemporaneous, “Lag 0”), simple average			1.73	14.82			1.69	15.79
1990-2009 (“Lag 1”), simple average			1.81	15.32			1.79	16.26
1989-2008 (“Lag 2”), simple average			1.89	15.91			1.89	17.14
1991-2010, weighted average (funds raised in the year)			1.39	8.54			1.39	8.88
1990-2009, weighted average (funds raised in the year)			1.40	8.80			1.40	9.08
1989-2008, weighted average (funds raised in the year)			1.43	9.28			1.42	9.52

Table III-continued

Panel B: All countries, Preqin

Fund vintage	All private equity deals				Buyouts			
	Number of transactions	PE funds raised ($million USD)	Capital-weighted TV/PI	Capital-weighted IRR (%)	Number of transactions	Total capital invested ($million USD)	Capital-weighted TV/PI	Capital-weighted IRR (%)
1989	73	19,690.66	2.69	24.9	12	7,969.27	2.81	28.3
1990	59	8,404.37	2.14	19.2	17	4,710.79	2.16	16.2
1991	37	4,071.48	2.83	26.7	9	2,456.21	3.21	32.4
1992	65	9,046.45	2.53	29.5	18	5,308.01	2.60	39.3
1993	73	14,567.60	2.89	24.4	15	10,169.94	2.43	20.2
1994	79	19,489.57	2.30	32.7	28	13,645.59	1.89	34.5
1995	89	30,371.62	2.26	22.1	24	20,786.34	1.66	15.6
1996	90	28,805.06	1.85	12.8	19	17,962.74	1.72	12.1
1997	125	60,155.91	1.89	21.1	37	42,205.49	1.71	15.6
1998	136	93,154.73	1.53	8.3	45	63,556.03	1.47	4.1
1999	128	90,476.30	1.38	6.1	32	43,426.05	1.61	10.1
2000	209	141,462.34	1.44	9.7	53	70,830.06	1.67	14.7
2001	150	102,297.95	1.83	19.6	26	45,436.77	2.38	32.2
2002	109	36,848.23	1.71	20.4	25	22,739.32	1.89	24.4
2003	113	48,593.85	1.72	17.4	29	32,036.12	1.96	23.5
2004	155	62,078.58	1.47	12.4	33	38,350.94	1.70	18.8
2005	222	142,117.84	1.26	6.5	62	110,172.62	1.35	9.3
2006	277	224,206.75	1.06	1.7	75	159,340.64	1.04	1.0
2007	330	190,399.58	1.06	2.1	70	119,769.36	1.09	3.2
2008	270	172,747.71	1.12	6.3	63	115,337.15	1.05	2.9
2009	107	51,693.63	1.11	n/m	23	27,944.18	1.07	n/m
2010	119	27,833.46	1.02	n/m	28	10,455.67	0.95	n/m
2011	104	16,883.27	0.79	n/m	22	14,559.34	0.72	n/m
Total (1991-2011):	2,987	1,567,301.89	--	--	736	986,488.58	--	--
Benchmark:								
1991-2010 (contemporaneous, “Lag 0”), simple average			1.71	15.54			1.72	17.44
1990-2009 (“Lag 1”), simple average			1.77	15.74			1.78	17.37
1989-2008 (“Lag 2”), simple average			1.85	16.20			1.87	17.92
1991-2010, weighted average (funds raised in the year)			1.39	8.73			1.42	9.57
1990-2009, weighted average (funds raised in the year)			1.40	8.95			1.42	9.70
1989-2008, weighted average (funds raised in the year)			1.43	9.47			1.45	10.15

Table IV
Comparative analysis of direct investments performance, net returns

Each number corresponds to a difference in means of performance measures between deals in our direct investments sample (reported in Table II) and a private equity benchmark. The benchmarks—Preqin, Thomson Venture Economics (VE) and Burgiss—correspond to cumulative performance as of September 30, 2011 by fund vintage year. The first nine columns correspond to simple average across the years, i.e., each year portfolio and the corresponding benchmark are compared and averaged, regardless of the amount invested. In the last nine columns, the comparison of the benchmark and the portfolio observations is weighted by the amount of capital invested in that year (capital invested for our sample and total funds raised for the benchmark sample). "Lag 0" corresponds to a contemporaneous, 1991-2010, comparison of returns. In columns "Lag 1" and "Lag 2," the benchmark is lagged one year (1990-2009) and two years (1989-2008) respectively. Shaded cells are those where the direct investments perform better.

	Simple averages									Weighted average (capital invested/funds raised in the year)								
	All direct investments			Solo			Co-investments			All direct investments			Solo			Co-investments		
Benchmark lag:	Lag 0	Lag 1	Lag 2	Lag 0	Lag 1	Lag 2	Lag 0	Lag 1	Lag 2	Lag 0	Lag 1	Lag 2	Lag 0	Lag 1	Lag 2	Lag 0	Lag 1	Lag 2
	Panel A: TV/PI																	
Direct investment sample	2.88	2.88	2.88	3.98	3.98	3.98	1.68	1.68	1.68	1.78	1.78	1.78	3.08	3.08	3.08	1.20	1.20	1.20
Differences (as compared to):																		
Preqin, U.S., all PE	1.15	1.07	0.99	2.26	2.18	2.10	-0.05	-0.13	-0.21	0.39	0.38	0.36	1.69	1.67	1.65	-0.19	-0.20	-0.22
Preqin, U.S., buyouts	1.19	1.09	0.99	2.30	2.19	2.09	-0.01	-0.11	-0.21	0.39	0.38	0.36	1.69	1.68	1.65	-0.18	-0.20	-0.22
Preqin, global, all PE	1.17	1.11	1.03	2.27	2.21	2.13	-0.04	-0.09	-0.17	0.40	0.39	0.36	1.69	1.68	1.65	-0.18	-0.19	-0.22
Preqin, global, buyouts	1.16	1.10	1.01	2.26	2.20	2.11	-0.04	-0.11	-0.19	0.37	0.36	0.34	1.66	1.65	1.63	-0.21	-0.22	-0.24
VE, U.S., all PE	1.27	1.22	1.14	2.37	2.32	2.25	0.06	0.02	-0.06	0.45	0.44	0.42	1.74	1.74	1.72	-0.13	-0.14	-0.16
VE, U.S., buyouts	1.36	1.32	1.24	2.47	2.42	2.34	0.16	0.12	0.04	0.48	0.48	0.46	1.78	1.77	1.76	-0.09	-0.10	-0.12
VE, global, all PE	1.28	1.24	1.20	2.39	2.35	2.31	0.08	0.04	0.00	0.46	0.45	0.44	1.76	1.75	1.74	-0.12	-0.13	-0.14
VE, global, buyouts	1.34	1.31	1.26	2.45	2.42	2.36	0.14	0.11	0.06	0.47	0.47	0.46	1.77	1.76	1.76	-0.11	-0.11	-0.12
Burgiss, global, all PE	1.19	1.14	1.06	2.29	2.24	2.17	-0.01	-0.06	-0.14	0.48	0.47	0.45	1.78	1.76	1.75	-0.10	-0.11	-0.13
Burgiss, global,	1.17	1.11	1.04	2.27	2.21	2.14	-0.03	-0.09	-0.16	0.47	0.46	0.45	1.77	1.76	1.74	-0.11	-0.12	-0.13
	Panel B: IRR																	
Direct investment sample	17.18	17.18	17.18	30.17	30.17	30.17	18.91	18.91	18.91	6.15	6.15	6.15	16.82	16.82	16.82	-0.09	-0.09	-0.09
Differences (as compared to):																		
Preqin, U.S., all PE	2.36	2.63	1.27	15.35	15.62	14.26	4.09	4.35	3.00	-2.89	-2.65	-3.13	7.78	8.02	7.54	-9.13	-8.90	-9.37
Preqin, U.S., buyouts	1.39	1.73	0.05	14.38	14.72	13.04	3.11	3.46	1.77	-3.09	-2.93	-3.37	7.58	7.75	7.30	-9.34	-9.17	-9.62
Preqin, global, all PE	1.64	2.23	0.99	14.63	15.22	13.98	3.36	3.96	2.71	-3.05	-2.80	-3.32	7.62	7.87	7.36	-9.30	-9.04	-9.56
Preqin, global, buyouts	-0.26	0.68	-0.74	12.73	13.67	12.25	1.47	2.40	0.99	-3.81	-3.55	-3.99	6.86	7.12	6.68	-10.05	-9.80	-10.24
VE, U.S., all PE	4.53	4.09	3.68	17.52	17.08	16.67	6.25	5.82	5.41	-2.01	-2.07	-2.00	8.66	8.61	8.67	-8.26	-8.31	-8.25
VE, U.S., buyouts	6.08	5.38	4.83	19.07	18.37	17.82	7.80	7.11	6.56	-1.22	-1.38	-1.37	9.45	9.29	9.30	-7.47	-7.63	-7.62
VE, global, all PE	4.54	4.18	4.30	17.53	17.17	17.29	6.27	5.90	6.03	-1.59	-1.66	-1.41	9.08	9.02	9.26	-7.84	-7.90	-7.66
VE, global, buyouts	4.90	4.32	4.45	17.89	17.31	17.44	6.62	6.05	6.18	-1.32	-1.43	-1.07	9.35	9.24	9.60	-7.57	-7.68	-7.32
Burgiss, global, all PE	3.36	2.50	2.10	16.35	15.49	15.09	5.09	4.23	3.82	-2.08	-2.36	-2.32	8.59	8.31	8.35	-8.33	-8.60	-8.57
Burgiss, global,	2.66	1.71	1.22	15.65	14.70	14.21	4.38	3.44	2.95	-2.06	-2.23	-2.25	8.61	8.44	8.42	-8.31	-8.48	-8.50

Table V
Comparative analysis of direct investments performance, "net-net" returns

Each number corresponds to a difference in means of performance measures between deals in our direct investments sample (reported in Table II) and a private equity benchmark. The returns considered in this table are net of in-house investment cost and administrative cost, or "net-net" returns. (See Figure 3 for definitions.) The benchmarks—Preqin, Thomson Venture Economics (VE) and Burgiss—correspond to cumulative performance as of September 30, 2011 by fund vintage year. The first nine columns correspond to simple average across the years, i.e., each year portfolio and the corresponding benchmark are compared and averaged, regardless of the amount invested. In the last nine columns, the comparison of the benchmark and the portfolio observations is weighted by the amount of capital invested in that year (capital invested for our sample and total funds raised for the benchmark sample). "Lag 0" corresponds to a contemporaneous, 1991-2010, comparison of returns. In columns "Lag 1" and "Lag 2," the benchmark is lagged one year (1990-2009) and two years (1989-2008) respectively. Shaded cells are those where the direct investments perform better.

	Simple averages									Weighted average (capital invested/funds raised in the year)								
	All direct investments			Solo			Co-investments			All direct investments			Solo			Co-investments		
Benchmark lag:	Lag 0	Lag 1	Lag 2	Lag 0	Lag 1	Lag 2	Lag 0	Lag 1	Lag 2	Lag 0	Lag 1	Lag 2	Lag 0	Lag 1	Lag 2	Lag 0	Lag 1	Lag 2
	Panel A: TV/PI																	
Direct investment sample	2.85	2.85	2.85	3.94	3.94	3.94	1.65	1.65	1.65	1.76	1.76	1.76	3.04	3.04	3.04	1.18	1.18	1.18
Differences (as compared to):																		
Preqin, U.S., all PE	1.13	1.05	0.97	2.23	2.15	2.07	-0.08	-0.16	-0.24	0.37	0.35	0.33	1.66	1.65	1.63	-0.21	-0.23	-0.25
Preqin, U.S., buyouts	1.17	1.06	0.96	2.27	2.17	2.07	-0.04	-0.14	-0.24	0.37	0.36	0.33	1.67	1.65	1.63	-0.21	-0.22	-0.25
Preqin, global, all PE	1.14	1.08	1.00	2.25	2.19	2.11	-0.06	-0.12	-0.20	0.37	0.36	0.33	1.67	1.66	1.63	-0.21	-0.22	-0.25
Preqin, global, buyouts	1.13	1.07	0.98	2.24	2.18	2.09	-0.07	-0.13	-0.22	0.34	0.33	0.31	1.64	1.63	1.61	-0.24	-0.25	-0.27
VE, U.S., all PE	1.24	1.19	1.12	2.35	2.30	2.23	0.04	-0.01	-0.09	0.42	0.42	0.40	1.72	1.71	1.69	-0.16	-0.17	-0.18
VE, U.S., buyouts	1.34	1.30	1.22	2.44	2.40	2.32	0.13	0.09	0.01	0.46	0.45	0.44	1.76	1.75	1.73	-0.12	-0.13	-0.14
VE, global, all PE	1.26	1.22	1.18	2.36	2.33	2.28	0.05	0.01	-0.03	0.44	0.43	0.42	1.73	1.72	1.71	-0.15	-0.15	-0.16
VE, global, buyouts	1.32	1.29	1.24	2.42	2.39	2.34	0.11	0.08	0.03	0.45	0.44	0.44	1.74	1.74	1.73	-0.13	-0.14	-0.15
Burgiss, global, all PE	1.17	1.11	1.04	2.27	2.22	2.14	-0.04	-0.09	-0.17	0.45	0.44	0.43	1.75	1.74	1.72	-0.13	-0.14	-0.15
Burgiss, global,	1.14	1.09	1.01	2.25	2.19	2.12	-0.06	-0.12	-0.19	0.45	0.44	0.42	1.74	1.73	1.72	-0.13	-0.14	-0.16
	Panel B: IRR																	
Direct investment sample	13.85	13.85	13.85	26.93	26.93	26.93	14.62	14.62	14.62	4.58	4.58	4.58	15.46	15.46	15.46	-1.38	-1.38	-1.38
Differences (as compared to):																		
Preqin, U.S., all PE	-0.87	-1.37	-1.96	12.21	11.71	11.12	-0.09	-0.60	-1.19	-4.35	-4.43	-4.59	6.53	6.45	6.29	-10.31	-10.39	-10.55
Preqin, U.S., buyouts	-1.84	-2.31	-3.19	11.23	10.77	9.89	-1.07	-1.54	-2.41	-4.56	-4.62	-4.84	6.33	6.26	6.04	-10.52	-10.58	-10.80
Preqin, global, all PE	-1.59	-1.01	-2.25	11.49	12.07	10.83	-0.82	-0.23	-1.47	-4.51	-4.26	-4.78	6.37	6.62	6.10	-10.47	-10.22	-10.74
Preqin, global, buyouts	-3.49	-3.43	-3.97	9.59	9.65	9.11	-2.72	-2.65	-3.20	-5.27	-5.30	-5.46	5.61	5.58	5.43	-11.23	-11.26	-11.42
VE, U.S., all PE	1.30	0.87	0.45	14.38	13.95	13.53	2.07	1.64	1.22	-3.47	-3.53	-3.47	7.41	7.35	7.41	-9.43	-9.49	-9.43
VE, U.S., buyouts	2.85	2.15	1.60	15.93	15.23	14.68	3.62	2.93	2.38	-2.68	-2.84	-2.83	8.20	8.04	8.05	-8.64	-8.80	-8.79
VE, global, all PE	1.31	0.95	1.08	14.39	14.03	14.16	2.09	1.72	1.85	-3.05	-3.12	-2.87	7.83	7.76	8.01	-9.02	-9.08	-8.83
VE, global, buyouts	1.67	1.10	1.22	14.75	14.18	14.30	2.44	1.87	2.00	-2.78	-2.89	-2.53	8.10	7.99	8.35	-8.74	-8.85	-8.49
Burgiss, global, all PE	0.13	-0.73	-1.14	13.21	12.35	11.94	0.91	0.05	-0.36	-3.55	-3.82	-3.78	7.34	7.06	7.10	-9.51	-9.78	-9.74
Burgiss, global,	-0.58	-1.52	-2.01	12.50	11.56	11.07	0.20	-0.75	-1.24	-3.53	-3.69	-3.72	7.35	7.19	7.16	-9.49	-9.65	-9.68

Table VI
Comparative analysis of direct investments performance, market-adjusted returns

Each number corresponds to a difference in means of performance measures between deals in our direct investments sample and a private equity benchmark. The returns considered in this table are market adjusted. (See Figure 3 for definitions.) The benchmarks—Preqin, Thomson Venture Economics (VE) and Burgiss—correspond to cumulative performance as of September 30, 2011 by fund vintage year. The first nine columns correspond to simple average across the years, i.e., each year portfolio and the corresponding benchmark are compared and averaged, regardless of the amount invested. In the last nine columns, the comparison of the benchmark and the portfolio observations is weighted by the amount of capital invested in that year (capital invested for our sample and total funds raised for the benchmark sample). "Lag 0" corresponds to a contemporaneous, 1991-2010, comparison of returns. In columns "Lag 1" and "Lag 2," the benchmark is lagged one year (1990-2009) and two years (1989-2008) respectively. Shaded cells are those where the direct investments perform better.

	Weighted average (capital invested/funds raised in the year)								
	All direct investments			Solo			Co-investments		
Benchmark lag:	Lag 0	Lag 1	Lag 2	Lag 0	Lag 1	Lag 2	Lag 0	Lag 1	Lag 2
	Panel A: TV/PI								
Direct investment sample									
Adjusted by S&P 500 index	0.72	0.72	0.72	1.91	1.91	1.91	0.21	0.21	0.21
Adjusted by MSCI index	0.91	0.91	0.91	2.08	2.08	2.08	0.41	0.41	0.41
Differences (as compared to):									
Preqin, U.S., all PE	0.45	0.48	0.51	1.64	1.66	1.70	-0.06	-0.03	0.00
Preqin, U.S., buyouts	0.40	0.41	0.44	1.59	1.59	1.63	-0.11	-0.11	-0.07
Preqin, global, all PE	0.53	0.59	0.66	1.69	1.76	1.83	0.03	0.09	0.16
Preqin, global, buyouts	0.38	0.39	0.42	1.55	1.56	1.59	-0.12	-0.11	-0.08
VE, U.S., all PE	0.51	0.54	0.58	1.69	1.73	1.77	-0.01	0.03	0.07
VE, U.S., buyouts	0.49	0.50	0.54	1.68	1.69	1.73	-0.02	-0.01	0.03
VE, global, all PE	0.59	0.65	0.73	1.76	1.82	1.90	0.09	0.15	0.23
VE, global, buyouts	0.48	0.49	0.55	1.65	1.66	1.71	-0.02	-0.01	0.05
Burgiss, global, all PE	0.48	0.52	0.58	1.65	1.69	1.75	-0.02	0.02	0.08
Burgiss, global, buyouts	0.43	0.46	0.52	1.60	1.63	1.69	-0.07	-0.04	0.02
	Panel B: IRR								
Direct investment sample									
Adjusted by S&P 500 index	3.53	3.53	3.53	13.67	13.67	13.67	-2.37	-2.37	-2.37
Adjusted by MSCI index	10.37	10.37	10.37	18.08	18.08	18.08	5.99	5.99	5.99
Differences (as compared to):									
Preqin, U.S., all PE	-3.05	-2.55	0.12	7.09	7.59	10.25	-8.95	-8.45	-5.79
Preqin, U.S., buyouts	-4.88	-4.32	-1.45	5.25	5.82	8.69	-10.79	-10.23	-7.35
Preqin, global, all PE	0.49	0.97	3.00	8.20	8.68	10.71	-3.89	-3.41	-1.38
Preqin, global, buyouts	-2.98	-3.14	-2.10	4.73	4.57	5.60	-7.36	-7.52	-6.49
VE, U.S., all PE	-2.66	-1.19	1.24	7.47	8.95	11.38	-8.57	-7.09	-4.66
VE, U.S., buyouts	-3.37	-2.19	0.55	6.76	7.95	10.69	-9.28	-8.10	-5.35
VE, global, all PE	1.48	2.67	4.78	9.18	10.37	12.49	-2.91	-1.71	0.40
VE, global, buyouts	-0.88	-0.67	0.82	6.82	7.04	8.52	-5.27	-5.05	-3.57
Burgiss, global, all PE	-1.56	-0.66	1.42	6.14	7.04	9.13	-5.94	-5.05	-2.96
Burgiss, global, buyouts	-2.93	-2.24	-0.52	4.77	5.46	7.18	-7.31	-6.62	-4.91

Table VII
Multivariate analysis of direct investments and co-investments performance

In this table we look at the cross-section of deals; each observation is a separate direct investment. The dependent variable is a deal performance minus the corresponding benchmark. The benchmark is lagged by one year ("Lag 1" in the previous tables); i.e., a direct investment in year *T* is compared to performance of a fund closed in year *T-1*. The *Solo* independent variable indicates solo direct investments. Standard errors are clustered by the investor from which we obtained the data. ***, **, and * indicates statistical significance at the 1%, 5%, and 10% level, respectively.

	Benchmark: Preqin				Benchmark: Venture Economics			
Return type:	Net	Net	"Net-net"	"Net-net"	Net	Net	"Net-net"	"Net-net"
Benchmark matched on:	Investment type	Region	Investment type	Region	Investment type	Region	Investment type	Region
	Panel A: TV/PI							
All direct investments	-0.07	-0.06	-0.09	-0.08	-0.04	-0.01	-0.06	-0.03
(constant)	[0.10]	[0.10]	[0.10]	[0.10]	[0.14]	[0.12]	[0.14]	[0.12]
Solo direct investments	3.64**	3.64**	3.63**	3.63**	3.86**	3.84**	3.84**	3.83**
(marginal effect)	[1.45]	[1.45]	[1.45]	[1.45]	[1.37]	[1.35]	[1.37]	[1.35]
Observations	390	390	391	391	386	390	387	391
R-squared	0.011	0.011	0.011	0.011	0.013	0.013	0.013	0.013
	Panel B: IRR							
All direct investments	-5.91**	-5.65**	-9.33**	-9.07**	-4.61**	-3.99**	-7.86**	-7.20**
(constant)	[1.60]	[1.58]	[2.78]	[2.74]	[1.62]	[1.33]	[2.94]	[2.39]
Solo direct investments	13.67***	13.54***	14.55***	14.42***	13.32***	12.83***	13.85***	13.33***
(marginal effect)	[1.91]	[1.95]	[3.67]	[3.78]	[1.68]	[1.59]	[3.27]	[3.17]
Observations	326	326	326	326	381	385	381	385
R-squared	0.005	0.005	0.008	0.008	0.006	0.005	0.008	0.008

Table VIII
Factors influencing the performance differences: Venture deals and R&D intensity

Each observation is a direct investment. The dependent variable is the deal performance minus the corresponding benchmark. The benchmark is lagged by one year ("Lag 1" in the previous tables); i.e., a direct investment in year *T* is compared to performance of a fund closed in year *T-1*. Each coefficient reported in the table is a marginal effect. The *Solo* independent variable indicates solo direct investments. *R&D/assets* is the average industry research and development scaled by assets. *Venture deal* is a dummy indicating whether the deal is a venture deal (as opposed to a buyout investment). All regressions include investment year and investor dummy variables. Two-digit Standard Industrial Classification dummy variables are included in the first two specifications for each benchmark. Standard errors are clustered by investor from which we obtained the data. ***, **, and * indicates statistical significance at the 1%, 5%, and 10% level, respectively.

	Benchmark: Preqin				Benchmark: Venture Economics			
Return type:	Net	"Net-net"	Net	"Net-net"	Net	"Net-net"	Net	"Net-net"
	Panel A: TV/PI							
Solo direct investments	2.71*	2.69*	4.33*	4.33*	2.77*	2.74*	4.57**	4.56**
	[1.30]	[1.30]	[1.99]	[2.00]	[1.31]	[1.31]	[1.81]	[1.81]
Solo DI*Venture deal	-4.37***	-4.40***	--	--	-2.58**	-2.61**	--	--
	[0.87]	[0.89]			[0.86]	[0.88]		
Solo DI*Ind. R&D/assets	--	--	-1.42	-1.42	--	--	-1.42	-1.43
			[0.93]	[0.94]			[0.91]	[0.91]
Industry: R&D/assets	--	--	1.20	1.19	--	--	1.21	1.20
			[0.83]	[0.84]			[0.80]	[0.81]
Venture deal	0.90	0.92	0.36	0.37	0.85	0.87	0.33	0.33
	[1.15]	[1.14]	[0.28]	[0.28]	[1.26]	[1.25]	[0.21]	[0.21]
Fixed effect:								
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Investor	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
2-digit SIC	Yes	Yes	--	--	Yes	Yes	--	--
Observations	390	391	345	346	386	387	342	343
R-squared	0.157	0.157	0.072	0.072	0.153	0.153	0.066	0.067
	Panel B: IRR							
Solo direct investments	25.35***	28.16***	30.50***	29.20***	24.31***	25.87***	27.55***	26.21***
	[6.29]	[0.75]	[6.00]	[5.42]	[6.551]	[3.09]	[6.71]	[5.87]
Solo DI*Venture deals	-45.76**	-45.51**	--	--	-26.35**	-27.12***	--	--
	[12.88]	[16.11]			[9.79]	[7.08]		
Solo DI*Ind. R&D/assets	--	--	-45.86***	-44.46***	--	--	-44.05***	-42.68***
			[7.28]	[7.31]			[5.94]	[5.97]
Industry: R&D/assets	--	--	45.83***	44.44***	--	--	44.16***	42.80***
			[7.28]	[7.30]			[5.95]	[5.99]
Venture deal	-44.05**	-27.84**	-13.09**	-12.53**	-47.60***	-32.57***	-20.57***	-19.97***
	[12.30]	[8.42]	[3.88]	[3.72]	[7.31]	[4.94]	[3.72]	[3.65]
Fixed effect:								
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Investor	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
2-digit SIC	Yes	Yes	--	--	Yes	Yes	--	--
Observations	326	326	296	296	381	381	338	338
R-squared	0.227	0.236	0.134	0.134	0.229	0.244	0.150	0.151

Table IX
Factors influencing the performance differences: Distance to the target

Each observation is a direct investment. The dependent variable is the deal performance minus the corresponding benchmark. The benchmark is lagged by one year ("Lag 1" in the previous tables); i.e., a direct investment in year *T* is compared to performance of a fund closed in year *T-1*. The *Solo* independent variable indicates solo direct investments. *Distance* is the distance between the headquarters of the institutional investor and that of the portfolio company, in hundreds of kilometers. *Venture deal* is a dummy indicating whether the deal is a venture deal (as opposed to a buyout investment). All regressions include investment year, investor, and two-digit Standard Industrial Classification dummy variables. Standard errors are clustered by the investor from which we obtained the data. ***, **, and * indicates statistical significance at the 1%, 5%, and 10% level, respectively.

	Benchmark: Preqin		Benchmark: Venture Economics	
Return type:	Net	"Net-net"	Net	"Net-net"
	Panel A: TV/PI			
Solo direct investments (marginal effect)	4.71***	4.68***	4.80***	4.76***
	[1.12]	[1.12]	[1.12]	[1.12]
Solo DI*Distance	-0.22**	-0.22**	-0.20**	-0.20**
	[0.06]	[0.06]	[0.08]	[0.08]
Distance ('00 km)	0.00	0.00	0.00	0.00
	[0.01]	[0.01]	[0.01]	[0.01]
Venture deal	1.48	1.50	1.71	1.73
	[1.07]	[1.06]	[1.28]	[1.28]
Fixed effect:				
Year	Yes	Yes	Yes	Yes
Investor	Yes	Yes	Yes	Yes
2-digit SIC	Yes	Yes	Yes	Yes
Observations	380	381	376	377
R-squared	0.179	0.178	0.172	0.172
	Panel B: IRR			
Solo direct investments (marginal effect)	31.45	32.13*	28.31	28.58*
	[17.36]	[13.91]	[18.26]	[14.22]
Solo DI*Distance	-0.46	-0.40	-0.29	-0.29
	[0.31]	[0.28]	[0.20]	[0.19]
Distance ('00 km)	0.25	0.20	0.18	0.16
	[0.16]	[0.14]	[0.11]	[0.10]
Venture deal	-41.01**	-23.89**	-48.22***	-30.89***
	[11.62]	[6.99]	[4.98]	[1.80]
Fixed effect:				
Year	Yes	Yes	Yes	Yes
Investor	Yes	Yes	Yes	Yes
2-digit SIC	Yes	Yes	Yes	Yes
Observations	321	321	371	371
R-squared	0.221	0.234	0.225	0.243

Table X
Factors influencing the performance differences: Peak year

Each observation is a direct investment. The dependent variable is the deal performance minus the corresponding benchmark. The benchmark is lagged by one year ("Lag 1" in the previous tables); i.e., a direct investment in year *T* is compared to performance of a fund closed in year *T-1*. The *Solo* independent variable indicates solo direct investments. *Peak year* indicates investments made between 1998 and 2000 and 2005 and 2007. *Venture deal* is a dummy indicating whether the deal is a venture deal (as opposed to a buyout investment). All regressions include investor and two-digit Standard Industrial Classification dummy variables. Standard errors are clustered by investor from which we obtained the data. ***, **, and * indicates statistical significance at the 1%, 5%, and 10% level, respectively.

	Benchmark: Preqin		Benchmark: Venture Economics	
Return type:	Net	"Net-net"	Net	"Net-net"
	Panel A: TV/PI			
Solo direct investments (marginal effect)	2.32*	2.28*	2.67**	2.62**
	[1.05]	[1.03]	[0.82]	[0.81]
Solo DI*Peak year	2.35**	2.45**	2.13**	2.22**
	[0.86]	[0.84]	[0.83]	[0.82]
Peak year	0.32	0.26	0.41	0.35
	[0.55]	[0.51]	[0.58]	[0.54]
Venture deal	0.32	0.34	0.44	0.45
	[0.65]	[0.64]	[0.71]	[0.70]
Fixed effect:				
Investor	Yes	Yes	Yes	Yes
2-digit SIC	Yes	Yes	Yes	Yes
Observations	390	391	386	387
R-squared	0.105	0.105	0.107	0.107
	Panel B: IRR			
Solo direct investments (marginal effect)	11.07	14.66	9.33	8.87
	[12.08]	[11.50]	[10.65]	[9.75]
Solo DI*Peak year	45.69**	33.94*	38.99**	37.42**
	[16.36]	[14.94]	[13.68]	[13.74]
Peak year	-12.34	-11.30	-10.59	-9.04
	[12.35]	[11.71]	[11.78]	[11.44]
Venture deal	-44.08***	-24.98***	-50.37***	-43.33***
	[6.72]	[5.76]	[5.83]	[4.26]
Fixed effect:				
Investor	Yes	Yes	Yes	Yes
2-digit SIC	Yes	Yes	Yes	Yes
Observations	321	321	371	375
R-squared	0.165	0.174	0.156	0.150

Table XI
Co-investments deal size

This table compares the enterprise value of the co-investments in our sample with other deals in the same general partners' portfolios. To make this comparison, we look at deals where the GP name or the name of the target is available. For each co-investment, we construct benchmarks using all of the same GP's deals from CapitalIQ in the five-, three-, and two-year window preceding the co-investment. ***, **, and * indicates statistical significance at the 1%, 5%, and 10% level, respectively.

Benchmark window:	Obs.	GP's average deal ($million USD)	Diff.	*t*-stat		GP's median deal ($million USD)	Diff.	*t*-stat	
5-year	114	1,841.61	1,291.16	3.10	***	1,016.68	2,116.08	4.67	***
3-year	109	2,059.68	1,179.98	2.74	***	1,194.02	2,045.64	4.41	***
2-year	104	2,232.04	989.34	2.36	**	1,313.42	1,907.97	4.17	***