INFLUENCE IN DELEGATED MANAGEMENT: THE CASE OF PRIVATE EQUITY FUNDS FAVORING ACTIVE INVESTORS

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Abstract

I investigate whether large, active limited partners exert influence over the portfolio decisions made by private equity (PE) fund managers to the detriment, or benefit, of smaller investors in the pool. I document that 3.6 percent of portfolio companies have prior linkages to active investors in the funds. PE funds with these deal linkages perform 2.3 percentage points worse in IRR, robust to benchmark and placebo tests. I use portfolio company exit distributions to understand the mechanism and causality. On the flip side, I document that 2.2 percent of portfolio companies are bought by acquirers linked to the active investor. These exit linkages bring a positive excess IRR of 5.8 percentage points, presumably reflecting a bailing out of failed investments or a propping up of fund performance.

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I. Introduction

The limited partner structure that dominates venture capital and buyout funds (collectively, PE funds) provides long-horizon investors with opportunities to invest in the private equity asset class. The limited partner investors (the LPs) are "limited" not just in a liability sense, but also in a sense of being deemed passive investment for tax purposes. LPs provide passive capital to PE fund managers, who in turn engage in screening, building value with, and exiting portfolio companies. The new observation of this paper is that sometimes "passive" LPs have a say in the sourcing of deals, adding value, and exiting decisions made by PE fund managers. I begin this paper by creating new data on and documenting these linkages. My goal is to ask whether these situations of influence carry performance implications.

For motivation, imagine being a small LP investor, say a college endowment manager, investing alongside a large, active LP investor, say a large state pension or sovereign fund. Should you think twice about the large LP? Should you be worried that the large LP might influence the PE fund managers to benefit its own active portfolio, and that the PE fund allows this equilibrium because of the large LP's deep pockets? Or, are you pleased to be in a PE fund that is able to benefit from the prestige and networks of the large LP?

A quick anecdote of influence is the case of Steven Rattner. Rattner's private equity firm Quadrangle sought to manage assets of the New York State pension fund. As a quid pro quo, Rattner arranged for one of Quadrangle's portfolio companies to distribute a film produced by the brother of the New York State pension fund's chief investment officer (New York Times, January 3, 2011). "Chooch", the film, took in a rather puny total of $30,792 in revenues. Other investors in Quadrangle suffered performance losses for the private benefit extracted by the NY State fund.

The goal of the paper is to ask whether delegated asset managers act with favoritism toward particular investors. The innovation is not that large investors extract benefits from investment intermediaries *because of their large scale*. It is well known that fee schedules in asset management reflect scale pricing. Rather, this paper's innovation is that the actual portfolio of pooled money may be distorted to the preferences of the large investors. This is different than the scale implications in that other

investors potentially could forfeit returns rather than just the intermediary sharing rents with large investors. I discuss this equilibrium in the next section. My empirical strategy tackles a feasible look at this proposition in the PE fund industry, but hopefully the idea resonates more generally.

The large, active LPs that I have in mind are large state pension funds, very large family portfolios, and sovereign wealth funds. PE dealmaking has globalized in the last decade with PE funds adapting to new contract environments (Lerner and Schoar, 2005; Kaplan, Martel and Stromberg, 2006). The opening of new environments for investment may create value to information aggregation if markets are informationally less efficient. Thus, it may be that large, active LPs may provide advantages to PE funds with better access to information and mitigation of frictions. In other words, a very possible, second hypothesis is that large, active LPs improve the returns of the PE fund for all investors.

A facet of the timing of the research comes from the changing nature of long-horizon LPs, particularly large public pensions and sovereign funds. In-house expertise at large funds has increased, reflecting a high bar of human capital needed to evaluate the alterative asset class opportunities. With more human capital, long-horizon investors find themselves wondering why they need to lose rents to middlemen (Cremers and Pedajisto (2009); Dyck and Pomorski (2011); Andonov, Bauer, and Cremers (2012)).[2] A good depiction of active portfolio management by a pension is found in Cooke (2003), who details the Canadian Public Pension Investment Board's internally management of its portfolio and strategizing of synergies across numerous asset classes.

Asserting return-impacting influence entails documenting that linkages exist and that linkages cause returns to all investors in the PE funds to benefit or suffer.[3] I can rigorously document linkages and can establish, even tackling selection in observability, a robust empirical relation between linkages and PE fund returns. When I investigate causal mechanisms, I show how much of the performance

[2] It is perhaps somewhat ironic that pensions lead the way in being active in delegated management influence since the passive structure emerged to accommodate pensions (Gompers and Lerner, 1996).

[3] I assume that if the PE fund suffers, some benefit must accrue to the large LP influencing the decisions made by PE fund managers. This benefit may not necessarily be a financial return, but may reflect a political or social welfare objective.

implication I can pin down to causal influence and how much may be indicative of PE fund characteristics associated with allowing large LPs to exert influence. Both outcomes are interesting, in my opinion.

I begin by documenting the linkages between large investors and PE fund portfolio companies (both buyout and venture). I focus solely on sovereign wealth funds (SWFs) as the large investor because of the data availability of Dyck and Morse (2010), in particular, PE fund investments and the direct individual company holdings for the largest SWFs. Because SWF capital grows with oil or export revenues and not financial returns, they are a very attractive investor class for private equity funds, along the lines of Lerner and Schoar (2004). Furthermore, like large pension funds, Dyck and Morse (2010) document that sovereign wealth funds are active in particular industries, often holding controlling stake in direct investments.

I look up the portfolio companies held by each of the PE funds in which the SWF invests as an LP. I then use manual search procedures to capture linkages between the SWF (or the SWF's direct investments) and the portfolio companies in which the SWF invests passively through a PE fund.[4] I divide these linkages into two dimensions, what I loosely term "deal linkages" and "exit linkages". I use the word "deal" broadly to mean overlap of SWFs and portfolio companies in either the selection or the operations of companies. Exit linkages occur when the SWF has some ownership in the entity buying the portfolio company at the exit. I find at least one deal linkage in 54 percent of PE funds and 3.6 percent of portfolio companies. I find an exit linkage in 30 percent of PE funds and 2.2 percent of portfolio companies.

PE funds with a company deal linkage perform 2.3 percent *worse* in excess IRR (IRR over a benchmark). I show robustness to a battery of tests dealing with sample selection and the observability selection of PE funds with returns. The result is robust to benchmarking against returns of CalPERS, a similarly large, long-horizon, state investor as the SWFs and pensions. Placebo results using "chance"

[4] The search procedure has two pieces – (i) doing manual Google and Factiva searches between each portfolio company of the PE funds and the SWF itself and (ii) doing Lexis-Nexis scraping searches between each of the portfolio companies of the PE funds and each of the SWF direct equity holdings (public and private).

linkages between the Alaska Permanent Fund, a true passive investor, and portfolio companies have no return impact.

I then speak to the causal mechanism of these results. Is the performance of the portfolio companies influenced sufficiently large to drive the whole PE fund returns down by 2.3 percent, or are PE funds that allow active investor influence characteristically just worse in some way, perhaps distracted? I look to the exits of the portfolio companies, looking up each one manually. I fail to find evidence that influenced portfolio companies are less likely to IPO. In fact they are more likely to exit via a sale. I do find, however, that these exits take a year longer than non-linked portfolio companies. I also show that the linked companies exit at a lower multiple. Together, I can explain half of the performance difference at the PE fund level as being causal and half just indicative.

In contrast to the deal linkage results, I find that PE funds with an exit linkage to a SWF perform 5.8 percent *better* in excess IRR. Consistent with results in Chen, Gompers, Kovner and Lerner (2010), this latter evidence suggests that SWFs directly or indirectly set favorable "floors" to portfolio company performance in wanting to keep firms in business. An observationally equivalent story is that some SWF managers may want to buffer PE fund performance for their career concerns, in a long-run relationship with PE fund managers.

The rest of the paper proceeds as follows. Section II discusses some theoretic underpinnings as to how influence of active investors can persist if it represents a conflict of interest in delegated capital management. Section III presents the data about the sample, PE funds and outcomes. Section IV describes the linkage data and search results. Section V reports the paper results, showing the relation of linkages to PE fund performance as well as portfolio company performance. Section VI concludes.

II. Theoretical Arguments

When a SWF or pension fund influences a PE decision, it does so to maximize its own returns or objectives. These objectives may or may not represent a conflict of interest with the other LP investors, but I begin under the presumption that it does. The actions I have in mind are, for example, SWFs tilting

investment to capitalize (or recapitalize) direct holding companies of the SWF or, more likely, tilting investment to companies in which the SWF holds upstream-downstream interests. Also possible is the idea that a state or sovereign would influence to build networks or support local development.

Because PE fund managers act in a repeated game with LP investors, it is worth asking how a PE fund manager could maintain reputation while allowing influence. Favoritism in delegated management may persist because large investors increase the efficiency of PE fund managers' time. Having large LP investments shortens the time needed for fund raising, thereby freeing up PE manager time for adding value to portfolio companies. Likewise, by ensuring a PE fund fills its target fundraising, or fills quickly, the large LP may increase the reputational capital of the PE firm that in turn spills over to benefit the portfolio company. Under any of these scenarios, the small LP should be willing to allow the large LP to have a larger slice of the profits pie, with limits.

It is worth noting that PE funds have always given large LPs with a little extra icing on the cake, usually in the form of coinvestment opportunities (investing directly in portfolio companies alongside the PE fund without fees) or amended contract terms (side letters). The baseline justification is economies of scale in fundraising. What differs here is the implication of who sacrifices. When a large, active LP gets a better contract with the PE firm or gets coinvestment opportunities, the main implication is forgone intermediation fees for the PE firm. The returns impact to the other LPs will usually be modest. Conversely, in my story of influence, the transfer of rents is from the small LPs to the large active LP. In a mutual fund setting, Berk and Green (2004) suggest that higher ability intermediaries will increase their own returns to the point that investor returns become eroded to the competitive position. Allowing active influence may be a mechanism to achieve this goal.[5]

Another possibility as to why small investors might continue to invest in such settings stems from behavioral extensions to the Grossman/Hart/Moore property rights literature. What if small LPs invest

[5] Would it be possible for PE funds to punish large investors for influence that destroys value? This is not likely. Large LPs play in a repeated game with PE fund managers, but PE mangers cannot credibly commit not to accept the LP's money in the future if the large LP provides bad leads, just as providers of capital cannot credibly commit to not buy sovereign bonds after country default in the work of Bulow and Rogoff (1989).

with a reference point entitlement to returns, rather than an absolute one? We know that PE funds (in particular VC funds) exhibit performance persistence (Kaplan and Schoar, 2005). Hochberg, Ljungqvist, and Vissing-Jorgensen (2010) offer an explanation for persistence based on information asymmetry and getting access to the best funds. The small pension manager who wants to invest in this asset class may just be content with access to a PE fund that reaches some reference point return in the spirit of Hart (2008) or a reference return indexed to some benchmark as in Hart (2009). The small LP may consider the fact that the large, active LPs may extract more private benefits to be part of the cost to getting into a PE fund.

This paper need not be about favoritism. Large, active investors have access to private information and private networks that may generate superior performance for portfolio companies. It is not hard to imagine how a large SWF or public pension fund could enhance performance, with proprietary deal flow, networks to create revenue opportunities for new ventures, or connections to mitigate finance or regulation frictions. Lastly, large investors and their direct holdings might as a secondary buyer for failed investments to the extent that the large investor has a vested interest in the outcome of the portfolio company. Under these stories, all investors in the PE fund should benefit from the presence of a large, active LP.

In such an environment, the equilibrium question is why the active LP does not keep all the rents? Three possibilities seem reasonable. For a large investor to keep the rents of its private information, it would have to be the sole equity financier. Thus, a large LP may use the PE fund intermediary to dissipate idiosyncratic risk or to lever up the position. In addition, large LPs may also want to take advantage of the value added input and monitoring of the portfolio company provided by PE fund managers. Finally, large LPs may use PE funds to build networks for other activities.

III. Data & Statistics

SWFs, PE Funds and Portfolio Companies Data

The sample of Sovereign Wealth Funds (SWFs) is that of Dyck and Morse (2010); namely, state-owned investment vehicles with over US$10 billion in assets as of 2007, which invest in risky assets and have no short or medium term pension obligations. Dyck and Morse collect the individual company holdings (public equity and private equity) of each of these SWFs, combining to $1.2 trillion in holdings. The existence of these data are essential for what I am doing, as I exploit operational and ownership links between companies held directly by the SWF and portfolio companies held indirectly by the SWF via the PE funds.

For each SWF, I first identify investments in PE funds and then I gather information on the portfolio companies of these PE funds, starting with five databases: Galante's Directory of Alternative Investments, Capital IQ, Thomson One Banker, Preqin, and Zawya Dow Jones. I supplement the PE fund investment data by extracting information off SWF websites and the SWF Institute website and by searching Google and regional news sources.[6] Likewise, I supplement the portfolio company data available in the databases by searching for additional portfolio companies on the PE firm site, in regional news sources, and on Google.

Of an initial list of the twenty SWFs, thirteen have LP investments in private equity funds. Table 1 lists these funds, which are geographically located either in the Middle East (e.g., Kuwait Investment Authority, Abu Dhabi Investment Authority) or in Asia (e.g., Government of Singapore Investment Corporation, Malaysia Khazanah Fund) and the count of PE fund investments. Combined, these thirteen SWF invest in 241 PE funds. I exclude 7 fund of funds such that my final sample is 234 PE funds.

The Alaska Permanent Fund ("Alaska") is a special case, in that it outsources its asset management to specializing asset managers and is known to be passive (Institutional Investor, August 30, 2010). As such, it would be highly unlikely that the asset manager would actively influence PE fund

[6] In most instances, the data included details on the specific fund in which the SWF invested as an LP; however, in a few cases only the fund family was given. For these, I attribute the investment to a particular fund within the family based on investment dates.

decisions on behalf of Alaska. Alaska holds a portfolio with both LP private equity fund investments and a diversified portfolio of public equities.[7] Because Alaska holds stock in so many companies, it is very likely that Alaska has linkages between its direct holdings and the portfolio companies in which it invests indirectly. But, there is no reason to expect these chance linkages to result in a differential performance for the PE fund. Thus, I treat Alaska as a placebo investor.

My main sample of SWFs, without Alaska, consists of 163 PE funds and 2,274 underlying portfolio companies. Table 1 also shows the percentage of these funds which are venture capital as opposed to buyout, the average and median PE fund size[8], and the range of vintage years. These statistics vary quite a bit by SWF, and therefore my benchmarking of performance to the vintage - venture/buyout - geography level will be important. I later introduce and motivate two additional samples which are included as the bottom rows of Table 1. I use the CalPERS (California Public Employees Retirement System) portfolio of PE funds as a robustness benchmark for returns, and the randomly-selected set of PE funds as an exit distribution benchmark.

In Table 2, I report industry and geography characteristics of the portfolio company investments. Table 2 aggregates the information to three samples, the SWFs (from now on excluding Alaska), Alaska, and the random sample. The industry distribution does not differ widely by sample. The geographic distribution, however, shows that portfolio companies' locations reflect a home bias of the SWFs. Overall, the SWFs invest 15.8% in Asia (the Asian SWFs invest 16.7% in Asia) and 7.3% in the Middle East (the Middle Eastern SWFs invest 11.8% in the Middle East). One would expect that if investors are active, they should invest with a home bias. Hochberg and Rauh (2011) show this pattern for pension funds. What is a bit surprising is that the investments are not more home biased, possibly because SWF use intermediated investments to diversify (Dyck and Morse (2009)).

[7] Alaska is a SWF of nearly $30 billion, funded by the flow of oil in the State. As of 2008, Alaska held a diversified portfolio of 3,836 public equities in addition to 66 open LP investments in private equity funds. Over all years in the sample back to 1995, Alaska invested in 6,502 public equities and 71 funds.

[8] I am missing fund size for 23 of the 234 PE funds. After Table 1, I replace missing fund sizes with the vintage-venture/buyout average.

PE Fund Performance Data

The most used measure of performance for a PE fund is the fund internal rate of return (IRR). I collect PE fund IRRs from Preqin. Although IRRs are the natural starting point, they could suffer from a reporting selection bias (better performing funds report on average).[9] Of the 163 SWF PE funds and 71 Alaska PE funds, Preqin only has performance for 66 and 52 of them respectively. This selection bias should be less of a problem for my analysis in that I compare PE fund performance within the set of funds reporting, but nevertheless, I augment my analysis to include other metrics.

Also from Preqin, I collect the multiple-of-invested-capital, calculated as the money the PE fund realizes from portfolio company exits divided by the money the fund put into the companies. This performance metric has no time value of money concept, but is used widely by private equity funds raising capital because IRRs suffer from the assumption that idle capital attains the IRR return and because the lifespan of portfolio companies can only differ a few years among companies because of the PE fund structure. The fill of PE fund multiples of invested capital is slightly better than that of the IRRs.

For both of these measures, I construct an excess performance measure (*excess IRR* and *excess multiple*), where excess is defined as performance above a PE fund benchmark. I construct the benchmark from Preqin data of the median return of all PE funds in Preqin by vintage year, venture-versus-buyout, and geography. To ensure that I have sufficient funds to calculate benchmark performance, I construct geography at the level of North America, Europe, and the rest of the world. Since it takes some time for PE funds to invest and harvest these illiquid investments, and return calculations early in a fund life are not considered trustworthy, my primary returns analysis limits the sample to PE funds with vintages of at least five years old.

One might argue that the benchmark of all PE funds includes PE funds not appropriate for the portfolio of active investors like SWFs or large (often state) pension funds. In particular, very large investors will say that they do not have time to evaluate every possible small investment and thus scale and clarity of strategy may matter. For robustness, I compare the performance benchmarked to CalPERS

[9] For example, see Kaplan and Schoar (2005) and Sorenson (2010).

investments in PE funds. CalPERS reports returns on these investments (and not surprisingly, returns thus usually appear in Preqin as well). Benchmarking against CalPERS should bias estimates toward zero, as evidence suggests that CalPERS is itself active.

As robustness to any biases of using Preqin data, I also construct proxy measures of PE fund-level performance, building from prior literature. (See, for example, Kaplan and Schoar (2005); Lerner, Schoar and Wongsunwai (2007); and Hochberg, Ljungqvist and Vissing-Jorgensen (2010).) These measures are whether or not a follow-on fund is raised (*follow-on*), the lapse in years between funds (*years lapse of follow-on*), and the oversubscription percentage of the follow-on fund (*oversubscription follow-on)*. To construct these measures, I do manual searches in Capital IQ, Thomson and Galante for follow-on fund in the same series as the PE fund in the sample, cutting the analysis as of 2008, because the average length of time between funds is two to three years.

Table 3 reports performance statistics by the samples (SWF, Alaska, and CalPERS). Univariate comparisons across the samples will not be terribly informative here, since the vintage and venture/buyout choice of the investment varies quite a bit by investor sample. Nevertheless, it is worth noting that CalPERS has performed better than Alaska, which has performed better than the SWFs.

Exit Data for Portfolio Companies

In addition to performance at the PE fund level, I analyze performance at the portfolio company level. It is possible that PE funds that allow influence to happen are, for example, those most distracted by maximizing the size of their firm, and my linkages are just an artifact. To say that influence affects returns, I show mechanism evidence in terms of performance at the portfolio company level.

Tracking portfolio company returns is hard, since portfolio companies sparsely reveal the capital invested and the returns to that capital. I start by using the more observable performance metric, the exit type of each portfolio company. In general, portfolio companies that IPO or sell to another company have performed better than undergo a secondary buyout, or those going out of business. I categorize exits by looking up the portfolio companies individually in Thomson One Banker and Capital IQ. IPOs are easy to observe and code. Sales are also usually observable in the databases, although the value of the sale is

trickier. Thomson and Capital IQ also sometimes record if the company is defunct; however here the data are less consistent. If I find no information in the database, but the company is listed in the database, my first clue to the company being out of business is if the url for the company is no longer operative. I do exhaustive Google and Factiva searches for exit, liquidating asset sales, or out of business information. When I fail to find information, I code the portfolio company as still being in the portfolio. I do not evaluate these as exits.

I construct a benchmark to compare the exit distribution by creating a random portfolio of PE funds by randomly selecting 70 PE funds (to match the size of Alaska's original list) that match my distribution of SWFs in vintage and venture-versus-buyout. I discard these funds which are debt funds, fund of funds or funds that have no portfolio companies, leaving me with 48 PE funds. I then lookup the exits for each portfolio company for my random sample. Table 4 tabulates these exits.

I focus on columns 3, 6, and 9, since I ignore the companies still in the portfolio in my analysis. Column 3 reports that of those that did exit in the SWF sample, 55.2% of the companies exited via a sale[10], 22.4% closed shop or liquidated the equity, 12.4% IPOed, and 10.0% were resolved via a secondary buyout to another PE firm. The placebo Alaska, has a somewhat more equal distribution across exits, with IPOs, sales, buyouts and out of businesses comprising 19.3%, 45.6%, 16.8% and 18.2%, respectively. The random sample benchmark saw 9.5% IPO, 56.6% sell, 12.4% be bought out, and 21.5% close shop. Herein again, however, the vintage and venture/buyout type of these funds will matter in a multivariate setting.

Linkage Data

I want to be explicit as to what I mean by a linkage before describing the data search. Deal linkages concern either a linkage that may affect the selection of portfolio companies or the ongoing operations. In the former case, the SWF or its managers may have a personal network connection with the company or have previously invested in the company. I only code them as being a linkage if the

[10] These can be strategic or failed sales.

relationship between the SWF and portfolio company is *ex ante* to the PE fund investment in the portfolio company. Co-investment, which is investing alongside the PE fund in the portfolio companies, is not an ex ante linkage. Relatedly, I also code a deal linkage to exist if a SWF invests in two PE funds which syndicate investment into a single portfolio company. The second type of deal linkage occurs if the SWF is involved in operations of the portfolio companies. For example, a member of the SWF may be appointed to the portfolio company board, or other companies which are owned by SWFs have a key upstream or downstream relation with the portfolio company. Exit linkages, by contrast, are when the SWF, one of its direct holdings, or another PE fund in which the SWF invests buys the portfolio company from the PE fund.

To identify Deal and Exit Linkages, I implement a four-step process. I use a fictional startup portfolio company called Airplane Seats Venture to illustrate. The first step is to look for companies in which the SWF had an ownership stake prior to an investment by a PE fund. Did the SWF or its investment vehicle previously invest in Airplane Seat Venture? The second step is to do manual searches of news articles in Factiva and Google. I search for any hit with both the name of the SWF (or one of its investing vehicles) and the name of the portfolio companies in which the SWF invests indirectly through the PE fund. Factiva only brings up exact hits; thus I can read all results. In Google, I analyze the first two pages of results; for most searches, this included all of the results. In reading, I am not interested in the CEO of Airline Seat Venture and the head of investment for the SWF showing up at the gala opening of a new airport. Rather, I am interested in whether they ex ante served together, e.g., as investment professionals for the SWF or on a board of another company.

The third step captures relationships between companies the SWF directly owns and the PE fund companies. For example, Airline Seats Ventures may sell its products now or in the future primarily to ABC Airline owned by a SWF. This step involves a few million cross-searches. Thus, I use scraping algorithm to extract connections in Lexis-Nexis. The majority of the searches resulted in no hits. Where I

had a hit, I read all the articles for relationships.[11] The final step focuses on identifying linkages in exits. For the companies that exit by a sale or secondary buyout, I record the acquirer or PE fund name. I then cross-reference whether the acquirer was in the direct holdings of the SWF (or the SWF itself) or, for a secondary buyout, if the acquiring PE fund is also a fund in which the SWF invests.

Table 5 presents the linkages statistics and the distribution of the type of linkages. At the company level 3.66% of portfolio companies of the SWF sample have deal linkages, and 2.16% have exit linkages. These numbers translate into 54% of PE funds having at least one deal linkage and 30% having at least one exit linkage. For the placebo Alaska investor, many fewer deal linkages exist, but about the same number of exit linkages. Given that Alaska holds the market in its diversified portfolio, the fact that exit linkages for Alaska are very prevalent is not surprising. The key test will be whether they have performance implications, or not, as a placebo.

IV. Results

My empirical methodologies are sufficiently straightforward that I weave them in the results discussion. The basic flow is to ask whether linkages associate with higher or lower performance of the PE fund. Then I assess the robustness of such patterns to (i) tests for results being spurious, (ii) unsuitability or bias in benchmarks, and (iii) selection in Preqin return data. To go from an association to causation, I then look at performance of the portfolio companies themselves.

PE Fund Returns Results

Table 6 reports the main results as to whether investor influence affects PE fund returns. Column 1 reports estimates from regressing the PE fund Excess IRR on the count of Deal Linkages and,

[11] I encountered a difficulty with Lexis-Nexis in the process of this procedure and had to finish the process in Google for half of both Alaska and GIC portfolio companies. The process was not identical, as we had to filter through many more hits and in the end had only limited usable results. However, in as much as the proportion of searches for GIC and Alaska (the two largest PE fund investors) were about the same, I do not think this slight selection should interfere with results.

separately, Exit Linkages for fund vintages of 5 years or more. Influence in Deal Linkages has a negative and significant influence on Excess IRR leading to a PE fund performance decrease of 2.3 percentage points in IRR. Conversely, influence in Exit Linkages has a positive and significant impact, leading to a PE fund increase of 5.8 percentage points. Column 2 adds in the Alaska sample observations and linkages variables. Although the dependent variable in column 1 is an excess variable relative to a benchmark, the sample only compares excess returns linkages to no linkages performance among PE funds in which SWFs choose to invest. Perhaps my methodology of collecting linkages picks up something special about PE funds that is not related to influence but rather a characteristic of my design or of the types of PE funds large, sovereign investors choose. Adding Alaska linkages allows me to compare SWF linkages across a wider selection of PE funds and to compare linkage effects to placebo linkages. Alaska's linkages reflect coincidence rather than influence since its asset class portfolios are managed by distinct remote managers. I find this not to be the case. The Alaska linkages never lead to significant returns results (columns 2, 4, 5, 6, 7, 8).

The remaining columns of Table 6 are robustness tests of these columns 1 and 2 results to different samples and performance measures. In columns 3 and 4, the dependent variable is Excess Multiple of Invested Capital. The results are materially similar. Deal linkages lead to lower performance and Exit Linkages lead to higher performance, with a slightly larger sample size. Columns 5-8 address the possibility that multicollinearity among the two linkage measures is driving the result. I throw out the thirteen PE funds with both a Deal and an Exit Linkage and then estimate the effects for Deal and Exit Linkages separately. Although the coefficients become more imprecisely measured because of small samples, the results look similar. In columns 9 and 10, I change the vintage age minimum to 3 and 7 years (rather than my default of 5 year) for robustness. The shorter age cutoff (3 years) provides me with a larger sample, but the estimates are noisier. The magnitude of the results increases in the stringency of the age cutoff, perhaps as attenuation bias goes down.

Table 7 tests whether my results are robust to a different benchmark, in particular, a benchmark calibrated by similarly large, quasi-sovereign, long-horizon investor, namely, CalPERS. Instead of using

Excess IRR as my dependent variable, I use the native Net IRR. I include dummy variables for each vintage year and each geography (6 regions), and saturate the model as much as I can by interacting the year and geography fixed effect effects with the venture indicator. Then, I include all the observations of PE funds for CalPERS. The idea is to let the CalPERS observations help to calibrate the fixed effects for year and geography, by being venture or not, and then ask whether linkages still affect performance.[12]

Table 7 reports that the effect of linkage influence is unchanged from Table 6. Columns 1, 3, and 5 exclude Alaska, and columns 3-6 allow for CalPERS and Alaska fixed effects ("alphas") in PE Fund selection, just to ensure that I am not just loading a difference in PE fund picking onto the linkages variables. Across the first four columns, a Deal Linkage results in approximately a 4.1 percentage point decrease in performance, and an Exit Linkage results in a 4.8 percentage point increase in PE fund performance, consistent with the pattern of my main result of the prior table. Finally, the idea in columns 5 and 6 of Table 7 is to make sure that I am not benchmarking off the other PE funds chosen by the SWF investor. I toss out all PE funds in which the SWF invests passively (with neither type of linkage). The results are unchanged.

PE Fund Proxy Returns (Follow-On Variables) Results

To summarize the prior subsection, the main results (column 1 of Table 6) were that Deal Linkages result in 2.3 percentage points lower overall PE fund return and Exit Linkages result in 5.8 percentage points higher overall PE fund return. Alaska, a placebo, is not associated with any abnormal returns. The results from Table 7 suggest that the main IRR are robust to different benchmarks and samples. However, all of these results are cast in the problem of a possible selection bias in Preqin. Preqin only has returns for a portion of the overall sample, and although I benchmark against PE funds with the same selection bias, I may not be able to generalize outside of the "within" the selection sample.

[12] An alternative method would be to calculate the vintage-geography-venture return averages in CalPERS and test the linkages against this benchmark, similar to Table 6. I choose this less standard method to exploit the observation count for more precision in the estimates.

Table 8 estimates the effect of linkages on three additional measures of PE fund performance. The dependent variables in columns 1, 2, and 3 are, respectively, the existence of a follow-on fund (an indicator), the size of the follow-on fund (in $ millions and including $0 for no follow-on) and the oversubscription rate of the follow-on conditional on not being "still raising" and there being a follow-on. I include the $0 follow-on in the second dependent variable to capture both the intensive and extensive margins and to not parse down the sample (as in the third dependent variable).

Panel B of Table 8 conducts the simple exercise of testing how well these variables correlate with Excess IRR and Excess Multiple of Invested Capital. I put the Preqin excess returns variables on the right hand side, only so that I can control for the size of the original fund when the dependent variable is the size of the follow-on. All of the proxy variables for PE fund returns are positive and significantly correlated to Preqin returns, with varying amounts of variance explained.

Panel A of Table 8 reports estimates of regressing the proxy good return measures and the linkage indicators. Columns 1-3 report the results for all SWF PE funds which are more than five years dated and columns 4-6 limit to the smaller sample for which I also have Preqin data, for verification. I find that the relationship between Exit Linkages and my proxies for good returns is positive and significant in all of the full sample columns 1-3, with the pattern holding with less precision in columns 4-6. The Deal Linkages variable is negative across all rows but never significant. I interpret these results as suggestively consistent with my main returns results.

Portfolio Company Results & Causality

The results that Deal and Exit Linkages result in 2.3 percentage points lower and 5.8 percentage point higher PE fund returns, respectively, seem large, perhaps too large. The mean count of linkages per PE fund, conditional on their being a link, is 1.7 for Deal Linkages and 1.4 for Exit Linkages. A back-of-the-envelope calculation, assuming 10 equally-sized portfolio companies per PE fund, suggests that the 1.7 portfolio companies with Deal Linkages would need to have abnormal negative performance of 13.3

percentage points (in IRR) to yield PE fund excess return of negative 2.3. Likewise, the 1.4 portfolio companies with Exit Linkages would need a positive abnormal performance of 16.4 percentage points.

These figures are not out of the ballpark for private equity companies. The issue here is, however, whether I am identifying a causal link between poor performance of linked companies or, the existence of a linkage is endemic to some other characteristic of the PE fund. For example, the existences of linkages may be endemic to PE funds in which the management has insufficient time because of the size of the fund or distractions from other funds. Such funds may be more likely to accept recommendations from the active investors.

Turning to company exits performance may help in pinning down the mechanism of the return results. I am interested in whether exit performance gives a gauge that these individual linked companies could have large effects on performance, especially on the negative performance of PE funds with Deal Linkages. The idea is that performance on average via IPO is better than sales, which is better than secondary buyouts, which is better than going out of business. I toss out the companies still in the portfolio.

Table 9 reports results from systems of seemingly unrelated estimation of the likelihood of one of the four exits – IPO, sale, buyout, or out of business. I regress each of these exit indicators on a dummy for either deal linkages (the odd numbered rows) or exit linkages (the even numbered rows) and PE fund fixed effects. Thus, I am comparing exits within a given PE fund. Do the portfolio companies with a linkage in a PE fund do better than the other portfolio companies in the same PE fund? Going down the table, I iteratively also add in fixed effects for company investment year, company region, and company industry to ensure that I am not picking up omitted company profiles, even within a PE fund set of investment choices. I do this iteratively, as there are not many degrees of freedom within funds. The final set of rows (rows 9 and 10) focus the sample only on companies in PE funds for which I have Preqin data.

Exit Linkages (the even numbered rows), almost by definition, result in higher probabilities of exit by sale and buyouts. This is a bit of a circular exercise in that I defined exit linkages as being linked by sales and buyout links, but I present the results to show the large proportional effect. The offset of

these increases in sales and buyouts is fewer companies going out of business. This result is very consistent with the intuition that large LPs may bail out companies if they have some vested interest in the success of such ventures.[13]

Turning to the Deal Linkages, I find that companies with Deal Linkages are 13.5 percent more likely to exit via a strategic sale. Half of this effect is due to companies not going out of business, and the residual is in decreasing IPOs. This is not a fully satisfactory answer in that having an exit via a strategic sale may be, on average, worse than an IPO, but it is certainly better than going out of business. To the extent that IPOs are the bread-and-butter of returns for PE funds, given the nonlinear goal of going for big payoff companies, this result makes sense. But in that out of business exits increase as well, I need further evidence.

I can explore more details of these exits. Deal Linked exits occur more slowly on average. Ignoring the portfolio companies not yet exited, the average exit time for non-linked portfolio companies held by SWF is 4.0 years. For portfolio companies with Deal Linkages, the exit time is 4.85 years. The same numbers are approximately true for just looking at the length of time for the sale exits. Thus, the Deal Linked exits are slower by almost a year.

I simulate what the difference a year in holdings might make, under some basic assumptions about the distribution of returns within a PE fund. I assume that there are 10 portfolio companies, each one gets $1 of investment and each one has an investment horizon of 4 years until exit, to reproduce the data. Three fail outright at year 4. Four return the principal (with no profits) for a multiple of invested capital equal to 1. The other three are the performers. I assume they are all the same, and calculate the year 4 exit proceeds using the mean return in the data of 3.31% for the overall PE fund. Under these assumptions, these three exits must each have an IRR of 25.3% and a multiple of invested capital of 2.46. Extending the exit horizon out 1 year for 1.7 of the companies ("deal linked companies") yields 0.3

[13] I wish that I had enough companies with both deal and exit linkages to push this theory further, but I only have a dozen or so such overlaps.

percentage points in lower PE fund returns (5.5% lower returns for the portfolio company itself). This is only a fraction (13%) of the decline in IRRs captured in the estimation.

If horizon is not the full answer, then either these exits are transacting at lower valuations, or I am capturing an omitted feature of these PE funds, not caused by the linkage itself. I cannot uncover the returns of all portfolio companies, and the ones I can recover are subject to a selection bias. However, if I am willing to assert that this selection bias is the same irrespective of whether a Deal Linkage exists, I can look at the difference in returns. For the 792 portfolio company exits via a sale, I record the investment(s) and exit from Capital IQ and Thomson and calculate an IRR. From my initial analysis (50 company exits), I find that Deal Linked exits via sales have a lower IRR of 3.38%. Using my assumptions above, I find that another 1% of the 2.3% return reduction at the PE fund level is due to the linked portfolio company. Thus, between the longer horizon and the returns differential, I account for a little more than half of the reduction in PE fund performance due to this conflict of interest. The rest, I conclude, is due to an omitted characteristic of the PE fund with which a Deal Linkage associates.

VI. Conclusion

This paper documents the influence that large investors exhibit over PE fund decisions. Influence comes in the form of operational or selection linkages between investors and portfolio companies and exit linkages to investors observed when portfolio companies are close out of PE fund portfolios. In economic magnitude terms, large investors influence 3.6 percent of portfolio company deals and 2.3 percent of portfolio company exits. Exit Linkages result in 5.8 percent higher PE fund IRRs, and deal linkages result in 2.3 percentage points lower PE fund IRRs. These results appear to be robust.

To generate these magnitudes, the portfolio companies with deal linkages must perform 13.3 percentage points worse in IRR, companies with exit linkages must perform 16.4 better in IRR. I interpret evidence on exits that half of the PE fund performance decline found when Deal Linkages exist is causal. These companies perform worse and do so more slowly. Exit Linkage results suggest that large LP set

favorable “floors” set to prop up PE fund performance or to keep firms in business. The private incentives and networks of large, active LPs pay off for other LP investors in this arena.

If the question we undertook was whether LP investors should pay attention to selection of other LP investors in a PE fund, particularly active LP investors, the answer is yes. But, the details of when and where having active investors is good and bad may matter more than “if”.

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Table 1: Private Equity Funds Characteristics by Portfolio Owner

Reported is the sample's distribution of PE funds (column 1), portfolio companies (column 2), the percent of the PE funds which are venture capital rather than buyout (column 4), and the range of PE fund vintages (columns 7 and 8) by SWF. Column 3 is the number of portfolio companies per PE fund; i.e., column 2 divided by column 1. Columns 5 and 6 are the mean and median PE fund sizes, which come from a sample of 211 PE funds rather than 234. Also included is the distribution of the two additional samples used in the analysis, namely the CalPERS sample, and a random sample. The CalPERS sample is from CalPERS website. The random sample is chosen randomly from Thomson OneBanker as described in the text. CalPERS is only used as an alternative benchmark for PE fund returns; thus, I do not have the portfolio company distribution.

Sovereign Wealth Fund	Number of PE Funds (1)	Number of Portfolio Companies (2)	Portfolio Companies / PE Fund (3)	Percent of PE Funds which are Venture Capital (4)	Mean PE Fund Size ($ millions) (5)	Median PE Fund Size ($ millions) (6)	Minimum Vintage (7)	Maximum Vintage (8)
Abu Dhabi Investment Authority	11	125	11.4	0.182	1470.2	410.6	1989	2009
Dubai Holding	5	29	5.8	0.400	426.8	500.0	2005	2008
Dubai World	2	6	3.0	0.000	175.0	175.0	2006	2006
Government of Singapore Investment Corporation	83	1443	17.4	0.458	1231.9	550.0	1986	2008
Investment Corporation of Dubai	1	4	4.0	0.000	--	--	2005	2005
Kazakhstan	4	52	13.0	1.000	132.3	155.8	2000	2006
Kuwait Investment Authority	11	68	6.2	0.636	2952.9	284.0	1998	2007
Libyan Investment Authority	1	3	3.0	0.000	507.3	507.3	2007	2007
Malaysia Khazanah	2	13	6.5	1.000	90.0	90.0	2003	2006
Mubadala (Abu Dhabi)	1	9	9.0	0.000	13725.7	13725.7	2007	2007
Qatar Investment Authority	1	11	11.0	0.000	5500.0	5500.0	2006	2006
Temasek (Singapore)	41	511	12.5	0.415	752.2	270.4	1993	2008
Alaska Permanent Fund	71	700	9.9	0.254	4036.6	2310.3	1995	2010
Total SWF PE Funds	234	2974	12.7	0.385	2169.8	650.0		
Total SWF PE Funds Excluding Alaska	163	2274	14.0	0.442	1262.8	446.4		
Additional Samples								
CalPERS	209	--	--	0.158	--	--	1991	2010
Random Sample	48	483	10.1	0.414	374.6	81.7	1988	2007

Table 2: Portfolio Company Industry and Geography Breakdowns

This table reports the distribution of industries and geographies of the portfolio companies in each of the portfolios. In less than 10% of the cases, I fill in an unknown portfolio company region (geography) with the fund region (geography). The home bias might be of interest: For SWFs in the Middle East, the home region percentage is 0.118. For SWFs in Asia, the home region percentage is 0.167.

	SWFs	Alaska	Random Sample
	1	2	3
Industry Breakdown		Proportions	
Business Services	0.136	0.216	0.159
Consumer / Agriculture	0.082	0.120	0.048
Energy and Utilities	0.021	0.024	0.050
Health Care	0.147	0.116	0.143
Industrials	0.120	0.146	0.083
Information Technology	0.401	0.297	0.445
Materials	0.022	0.027	0.019
Real Estate	0.001	0.001	0.010
Telecoms / Media	0.070	0.053	0.043
Geography Breakdown		Proportions	
Africa / Middle East	0.073	0.009	0.006
Asia / Pacific	0.158	0.036	0.031
Europe	0.183	0.266	0.298
Latin America / Caribbean	0.008	0.006	0.014
United States / Canada	0.578	0.684	0.650

Table 3: PE Fund Performance Summary Statistics

The table reports performance statistics for PE funds in the SWF, Alaska and CalPERS samples, limiting to PE fund with vinatge of at least three years of age. Net IRR returns are from Preqin as is the Multiple of Invested Capital. Excess IRR and Excess Multiple are calculated as the return metric minus the vintage year - venture/buyout - geography benchmark for all funds in Preqin. Follow-On? is the existence of a follow-on fund in the same PE firm series. Size of follow-on is the size (in $ millions) of the follow-on fund. Oversubscribed is the percentage over- [or under-] subscribed the follow-on fund is. The CalPERS sample does not use these latter three proxy statistics. The original observation count, limiting to PE funds with vintage age of at least three years for SWFs, Alaska, and CalPERS is 162, 63, and 199, respectively.

SWF	Mean	Minimum	Median	Maximum	Standard Deviation	Observa-tions
Net IRR	5.16	-23.60	1.70	46.90	14.46	65
Excess IRR	-1.44	-25.30	-2.30	34.00	12.18	65
Multiple Invested Capital	1.17	0.24	1.01	2.79	0.53	77
Excess Multiple	-0.05	-1.41	-0.04	1.40	0.46	77
Follow-On?	0.64	0	1	1	0.48	133
Years Lapse to Follow-On	3.51	1	3	10	1.59	53
Oversubscribed	-0.032	-0.782	0.000	0.587	0.253	56
Alaska						
Net IRR	0.42	-47.80	0.15	39.60	12.25	52
Excess IRR	-3.02	-55.10	-3.30	26.70	12.54	53
Multiple Invested Capital	1.03	0.00	1.00	2.37	0.33	57
Excess Multiple	-0.02	-1.05	-0.05	0.84	0.30	57
Follow-On?	0.56	0	1	1	0.50	61
Years Lapse to Follow-On	2.58	1	2	5	1.23	31
Oversubscribed	-0.063	-0.640	0.004	0.150	0.215	25
CalPERS						
Net IRR	8.40	-43.20	5.35	95.40	17.36	198
Excess IRR	1.03	-43.50	-0.20	78.90	15.37	196
Multiple Invested Capital	1.40	0.00	1.20	8.50	0.79	199
Excess Multiple	0.15	-1.10	0.05	6.97	0.67	198

Table 4: Distribution of Exits for Portfolio Companies

The table reports the distribution of exits for the portfolio companies in which a SWF or Alaska invests. The exit data are from Capital IQ, Thomson One Banker and manual seraches as described in the text. I coded "still in portfolio" to mean either that we know the company to be still in the portfio or no information was found to say otherwise. We do not use these in the analysis. The data displayed and used are only for vintage fund which are older than 5 years.

	SWFs			Alaska			Random Portfolio		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Count	Percent	Percent without "Still in Portfolio:	Count	Percent	Percent without "Still in Portfolio:	Count	Percent	Percent without "Still in Portfolio:
IPO	180	8.3%	12.4%	55	8.0%	19.3%	23	4.8%	9.5%
Sold to Company	803	37.2%	55.2%	130	19.0%	45.6%	137	28.4%	56.6%
Secondary Buyout	145	6.7%	10.0%	48	7.0%	16.8%	30	6.2%	12.4%
Out of Business	326	15.1%	22.4%	52	7.6%	18.2%	52	10.8%	21.5%
Still in Portfolio	706	32.7%		400	58.4%		241	49.9%	
Total	2,160			685			483		

Table 5: PE Fund and Portfolio Company Linkages

Panel A reports the proprotions of Deal and Exit Linkages in PE funds and in portfolio companies. For example, 0.54 means that 54% of PE funds have at least one linkage between a portfolio company and the investor. Panel B reports details on these linkages. (Note: Panel B is slightly incomplete.)

Panel A: Proportions of Linkages	Proportion	
Funds with Linkages	SWF	Alaska
Deal Linkage in Fund	0.540	0.113
Exit Linkage in Fund	0.300	0.352
Sample Size (# Funds)	163	71
Companies with Linkages		
Deal Linkage in Fund	0.0366	0.0111
Exit Linkage in Company	0.0216	0.0357
Sample Size (# Companies)	2,264	700

Panel B: Details of Linkages	Main + Scraping Linkages	
	SWF	Alaska
Deal Linkages		
SWF direct holding has upstream/downstream relationship	42	22
SWF employee has upstream/downstream relationship	8	--
Portfolio company board member is linked to SWF	9	--
SWF invested in portfolio company prior to PE fund investment	6	--
PE fund hired SWF employee	2	--
SWF provided debt financing to portfolio company	2	--
Portfolio company executive is linked to SWF Direct holding	--	2
Portfolio company executive is linked to SWF	1	1
Total Deal Linkages	70	25
Exit Linkages		
Portfolio company sold to SWF direct holding or sold to linkage of SV	27	25
Portfolio company sold to PE fund, owned or funded as LP by SWF	7	--
SWF has a board relationship with purchasing company	10	--
SWF invested in purchasing company through another PE fund	2	--
Portfolio company sold to the government of SWF country	1	--
Total Exit Linkages	47	25

Table 6: Fund Performance Results

The dependent variable is either the PE fund Excess IRR or Excess Multiple of Invested Capital, as marked. Returns are measured in percentage points (a coefficient of 2 is a 2% return impact). Excess is defined in both cases to be the return of the PE Fund from Preqin minus the vintage year - venture/buyout - geography benchmark (the median for all such PE funds in Preqin). Deal and Exit Linkages are the count of activism linkages, capturing the relationship between the investor and the PE fund portfolio companies. Columns 1, 3, 9 and 10 exclude the placebo investor Alaska. In the other columns, Alaska's linkages are included as a separate dependent varaible. Colums 5 - 8 exclude the thirteen PE funds with both deal and exit linkages. Columns 9 and 10 alter the minimum vintage age cutoff to be included in the regression. All estimates are OLS. Robust standard errors appear in brackets and *, **, and *** denote significance at the 10%, 5%, and 1% level respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Dependent Variable:	Excess IRR	Excess IRR	Excess Multiple	Excess Multiple	Excess IRR	Excess IRR	Excess Multiple	Excess Multiple	Excess IRR	Excess IRR
SWF Deal Linkages	-2.263*	-2.424**	-0.0854	-0.0960*	-1.715		-0.134*		-1.763	-3.473**
	[1.262]	[1.220]	[0.0520]	[0.0508]	[1.566]		[0.0688]		[1.136]	[1.578]
SWF Exit Linkages	5.796***	5.548***	0.203***	0.186**		5.071**		0.194*	4.686**	7.334**
	[1.960]	[1.939]	[0.0753]	[0.0756]		[2.169]		[0.100]	[1.916]	[2.919]
Alaska Deal Linkages		1.973		0.0767	1.585		0.0615			
		[1.390]		[0.0475]	[1.444]		[0.0492]			
Alaska Exit Linkages		1.219		0.057		1.304		0.065		
		[1.426]		[0.0551]		[1.419]		[0.0558]		
Constant	-2.515	-1.765	-0.0993	-0.0515	-1.267	-2.018*	-0.0319	-0.0758*	-2.094	-0.555
	[1.832]	[1.295]	[0.0631]	[0.0445]	[1.371]	[1.166]	[0.0472]	[0.0397]	[1.705]	[2.402]
Observations	56	92	68	105	79	79	89	89	65	41
R-squared	0.092	0.071	0.078	0.066	0.007	0.044	0.026	0.051	0.059	0.113
Vintage Age Cutoff	>=5	>=5	>=5	>=5	>=5	>=5	>=5	>=5	>=3	>=7
Sample Includes	SWFs	SWF, Alaska	SWFs	SWF, Alaska	SWF, Alaska	SWF, Alaska	SWF, Alaska	SWF, Alaska	SWFs	SWFs

Table 7: Performance Results using CalPERS as a Benchmark

The dependent variable is either the PE fund Net IRR from Preqin or CalPERS. Returns are measured in percentage points. Only PE funds with vintage life of at least five years are included. Deal and Exit Linkages are the count of activism linkages, capturing the relationship between the investor and the PE fund portfolio companies. Not shown are venture, vintage, and geography fixed effects as well as vintage-geogeraphy and vintage-venture fixed effects. Columns 2, 4, and 6 include the placebo investor Alaska. All columns include the CalPERS PE fund observation with no linkages coded. Columns 3-6 include a dummy for CalPERS and Alaska (where appropriate). Columns 5 and 6 remove all PE funds of the SWFs that do not have a linkage to act as if the PE fund were part of the CalPERS or Alaska portfolio. Estimates are OLS. Robust standard errors appear in brackets and *, **, and *** denote significance at the 10%, 5%, and 1% level respectively.

Panel A	Dependent Variable: PE Fund Net IRR					
	(1)	(2)	(3)	(4)	(5)	(6)
SWF Deal Linkages	-4.208**	-4.451**	-3.823**	-4.030**	-4.414*	-4.606**
	[1.876]	[1.880]	[1.897]	[1.900]	[2.335]	[2.304]
SWF Exit Linkages	4.362**	4.360**	5.207**	5.223***	4.605**	4.664**
	[2.050]	[1.922]	[2.051]	[1.946]	[2.104]	[2.003]
Alaska Deal Linkages		1.131		1.635		0.649
		[1.978]		[2.059]		[1.623]
Alaska Exit Linkages		0.309		0.335		1.61
		[1.348]		[1.453]		[2.253]
CalPERS			3.872	4.049	2.769	2.513
			[2.664]	[2.600]	[6.042]	[5.876]
Alaska				2.516		0.828
				[2.959]		[6.233]
Observations	205	241	205	241	174	210
R-squared	0.393	0.400	0.400	0.407	0.386	0.398
Fixed Effects Included:	Venture, Geography (6 regions), Vintage, Venture*Vintage, and Geography * Vintage					

Table 8: Follow-On Proxy Returns

The dependents variables are whether a follow-on PE fund has been raised (columns 1 and 4), the size of the follow-on fund, including zeros for none, (columns 2 and 5) and the extent to which a follow-on fund raised is over- [under-] subscribed (columns 3 and 6). Only PE funds with vintage life of at least five years are included. Columns 4-6 include only PE funds with returns given in Preqin to match the sample in Table 5. The sample excludes the Alaskan PE funds. Deal and Exit Linkages are the count of activism linkages, capturing the relationship between the investor and the PE fund portfolio companies. Not shown are venture, vintage, and geography fixed effects as well as vintage-venture fixed effects. Estimates are OLS. Robust standard errors appear in brackets and *, **, and *** denote significance at the 10%, 5%, and 1% level respectively. Panel B presents tests of the validity of the proxy variables.

Panel A

				Limited to Sample with Preqin Returns		
Dependent Variable:	Follow-On Indicator	Follow-On Fund Size ($million)	Follow-On Oversubscrip-tion Ratio	Follow-On Indicator	Follow-On Fund Size ($million)	Follow-On Oversubscrip-tion Ratio
	(1)	(2)	(3)	(4)	(5)	(6)
SWF Deal Linkages	-0.008	-325.1	-0.0258	-0.0207	-529.1	-0.0528
	[0.0354]	[205.8]	[0.0330]	[0.0375]	[399.9]	[0.0357]
SWF Exit Linkages	0.146***	1,118*	0.141***	0.0886	1,638	0.157***
	[0.0470]	[583.2]	[0.0388]	[0.0559]	[1,021]	[0.0455]
Fund Size (original)		0.349*			0.405	
		[0.205]			[0.284]	
Observations	133	106	53	75	65	38
R-squared	0.512	0.558	0.454	0.635	0.601	0.751
Fixed Effects Included:	All include Venture, Geography (6 regions), Vintage, Venture*Vintage					

Panel B: Checking the Validity of Proxies

Dependent Variable:	Follow-On Indicator	Follow-On Fund Size ($million)	Follow-On Oversubscrip-tion Ratio	Follow-On Indicator	Follow-On Fund Size ($million)	Follow-On Oversubscrip-tion Ratio
Excess IRR	0.00932***	119.7**	0.00718**			
	[0.00294]	[46.90]	[0.00320]			
Fund Size (original)		0.524***			0.502***	
		[0.163]			[0.153]	
Excess Mulitple				0.158	3,208**	0.252***
				[0.104]	[1,236]	[0.0829]
Constant	0.704***	1,078***	-0.0525	0.657***	856.4***	-0.0643**
	[0.0416]	[366.3]	[0.0321]	[0.0413]	[310.0]	[0.0304]
Observations	117	99	56	132	112	60
R-square	0.061	0.289	0.090	0.018	0.275	0.139

Table 9: Exit Distribution Results at Company Level

The table reports estimates from systems of semmingly unrelated equations. Each numbered row is a SUR estimation. Each system has four equations (the four columns) reflecting four 0/1 dependent variabel sof the exit out (IPO, Sale, Buyout, Out of Business). The sample excludes the Alaskan PE funds. Each estimaton is just one independent variable, the exitor deal linkage indicator, plus the fixed effects given in the leftmost column. All estimations include PE fund fixed effects. Robust standard errors appear in brackets and *, **, and *** denote significance at the 10%, 5%, and 1% level respectively. The single r-square reported for the four depenedent variables is the SUR system R-square.

			Estimation 1					
		Dependent Variable:	IPO	Sale	Buyout	Out of Business	Obser-vations	R-squared
Fixed Effects Levels:		Independent Variable:						
Fund								
	1)	Deal Linkages	-0.0597*	0.135**	-0.00215	-0.0764*	2,728	0.050
			[0.0320]	[0.0577]	[0.0269]	[0.0437]		
	2)	Exit Linkages	-0.0499	0.377***	0.0983***	-0.147***	2,728	0.050
			[0.0389]	[0.0697]	[0.0326]	[0.0529]		
Fund, Industry								
	3)	Deal Linkages	-0.0555*	0.126**	0.00473	-0.0733*	2,722	0.080
			[0.0316]	[0.0577]	[0.0269]	[0.0436]		
	4)	Exit Linkages	-0.0517	0.377***	0.0973***	-0.156***		
			[0.0384]	[0.0698]	[0.0326]	[0.0530]		
Fund, Region								
	5)	Deal Linkages	-0.0536*	0.116**	-0.0023	-0.0713	2,728	0.056
			[0.0320]	[0.0571]	[0.0268]	[0.0436]		
	6)	Exit Linkages	-0.0536	0.380***	0.102***	-0.144***	2,728	0.056
			[0.0388]	[0.0690]	[0.0325]	[0.0529]		
Fund, Invest Year								
	7)	Deal Linkages	-0.0688**	0.146**	-0.0275	-0.0698	2,556	0.065
			[0.0343]	[0.0613]	[0.0287]	[0.0470]		
	8)	Exit Linkages	-0.062	0.343***	0.108***	-0.157***	2,556	0.064
			[0.0418]	[0.0744]	[0.0349]	[0.0572]		
Fund								
Sample	9)	Deal Linkages	-0.0518	0.140*	-0.0361	-0.0902	1,911	0.044
Constrained to			[0.0398]	[0.0736]	[0.0354]	[0.0558]		
Preqin Sample	10)	Exit Linkages	-0.0573	0.342***	0.104**	-0.132**	1,911	0.044
			[0.0477]	[0.0881]	[0.0424]	[0.0669]		

Table 10: Exit Distribution Multinomial Logit Results

The table reports an estimate from a multinomial choice model in which the choice of exit is among IPO, sale, buyout, or out of business (still in portfolio is the omitted category). Only companies in PE funds with vintage life of at least five years are included. Deal Linkages are the count of activism linkages, capturing the relationship between the investor and the PE fund portfolio companies. Exit Linkages are not included because the existence of one of these linkages implies a sale or buyout exit. Not shown are log of PE fund size, venture*log PE fund size, company investment year, company region, and company industry. *, **, and *** denote significance at the 10%, 5%, and 1% level respectively.

Dependent Variable: Which Exit (Excluded in "Still in Portfolio")		
IPO Equation:	SWF Deal Linkages	0.3647
		[0.4327]
Sale Equation:	SWF Deal Linkages	1.045***
		[0.2813]
Buyout Equation:	SWF Deal Linkages	1.039*
		[1.039]
Out of Business Equation:	SWF Deal Linkages	-0.3233
		[0.5675]
	Observations	3447
	Pseudo R-square	0.177
Control Variables for each equation:	Company Investment Year, Company Region, Company Industry, Venture, Log PE Fund Size, Venture*Log PE Fund Size	