Fisher College of Business
Working Paper Series

Charles A. Dice Center for Research in Financial Economics

Private Equity in the 21st Century: Cash Flows, Performance, and Contract Terms from 1984-2010

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Dice Center WP 2010-021
Fisher College of Business WP 2010-03-021

December 2010

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Abstract

Using detailed quarterly cash flow data for a large sample of private equity funds from 1984-2010, we examine cross-sectional and time-series cash flow performance of private equity funds across a range of asset classes, including venture capital, buyout, real estate, distressed debt, and funds-of-funds. Our data also include key features of the management contracts, specifically carried interest, management fees, and general partner capital commitments, allowing us to investigate the determinants of contractual terms and to link contractual terms to performance. The data reveal important facts about the private equity market in the 21^{st} century. On average, our sample private equity funds have outperformed the S&P 500 on a net-of-fee basis by about 15%, or about 1.5% per year. Performance varies considerably across fund types and over time. Larger funds require larger percentage capital commitments from the general partners (GPs), consistent with concerns about GP incentives in large funds. Larger funds also charge lower management fees, and obtain higher carried interest, consistent with learning about GP ability. Management fees, but not carried interest, are higher during fundraising boom periods, even controlling for fund size, suggesting that the fixed/variable mix of GP compensation shifts toward fixed components during fundraising booms, consistent with increased GP bargaining power in booms. In marked contrast to the mutual fund literature, there is no relation between management fee and carry terms and net-of-fee performance, suggesting that GPs with higher fees earn them in the form of higher gross-of-fee performance. There is some evidence that funds with lower GP capital commitments outperform. Conclusions about private equity performance over time differ markedly depending on whether performance is measured in absolute terms (IRR) or adjusted for the performance of the S&P 500 (PME). In particular, funds raised during hot markets underperform in terms of IRR, but not in terms of PME. Capital calls and distributions are both more likely and larger when public equity valuations rise and when liquidity conditions tighten. During the financial crisis and ensuing recession of 2007-2009, the component of calls unexplained by macroeconomic factors spiked, distributions plummeted, and the sensitivity of calls and distributions to underlying macroeconomic conditions changed considerably.

*We thank Steve Kaplan, Per Strömberg and Mike Weisbach for helpful comments and discussions. Contact information: davidr@duke.edu; sensoy_4@fisher.osu.edu .

I. Introduction

Private equity has emerged as a central feature of financial markets over the last thirty years. According to Private Equity Analyst, capital commitments to U.S. venture capital and buyout funds grew from $0.78 billion in 1980 to $28.6 billion in 1995 to $278 billion in 2007, before declining in the wake of the financial crisis to $67 billion in 2009.

Despite the importance of private equity both as an asset class for investors and as a source of capital for firms, we have a limited understanding of the returns, contractual features, and behavior of cash flows in private equity. This is especially true in the period after 1995, which has seen most of the growth in the industry, including the venture capital boom of the late 1990s and the buyout boom of the mid-2000s. This gap in our knowledge stems largely from lack of cash flow data detailing the capital calls and distributions to and from private equity funds, as well as a lack of data on the contractual arrangements between private equity investors (limited partners, LPs) and managers (general partners, GPs). These data limitations are a consequence of the fact that private equity is largely exempt from the disclosure regulations that surround public equity markets.

In this paper, we use a large, proprietary database of private equity funds from 1984 to 2010 to study private equity in the 21^{st} century. The data were provided to us by a large, (anonymous) institutional limited partner with extensive investments in venture capital, buyout, real estate, distressed debt, and fund-of-fund private equity funds. Our data include all of these types of funds, and offer several distinct advantages over existing private equity databases.

First, and crucially, we have complete information on the quarterly cash flows to and from the funds and their investors. These data allow us to go beyond what is possible with fund-level IRRs, and so to overcome a key obstacle faced by much of the private equity literature. In particular, we use the cash flow data to compute and analyze measures of performance adjusted for market conditions (i.e., public market equivalents, PMEs), which are essential to comparing the performance of private equity to that of public markets, and to assessing the opportunity cost of private equity investments. We also compare the inferences about private equity performance obtained with PMEs to those obtained with IRRs. These data come directly from the limited partner's internal accounting system, and therefore do not suffer from any reporting or survivorship biases that are likely responsible for the discrepancies between commercially available private equity data sources (Harris, Jenkinson, and Stucke, 2010).

A second important advantage of our data is its coverage of the key parameters that govern the management contract between the limited and general partners. In addition to the management fee and carried interest that the general partners earn as compensation, our data are unique in that they include information on the general partners' own investment in the fund. Our sample of management fee and carry data is both larger and more recent than those of Gompers and Lerner (1999) and Metrick and Yasuda (2010). The combination of detailed cash flow data, along with the terms of the management contract, allow us not only to investigate private equity performance and the determinants of the terms of the management contract, but also to analyze the relation between fund performance and fund characteristics and contractual terms in a way that has not been previously possible.

A final advantage of our private equity cash flow data is its recency and its coverage of the financial crisis of 2007-2009. Previous work using cash flow data to analyze the performance of private equity funds has been largely limited to funds started before 1995 with cash flows extending to 2003 at the latest (Kaplan and Schoar, 2005; Phalippou and Gottschalg, 2009; Ljungqvist, Richardson, and Wolfenzon, 2007). Because our cash flow data extend through the second quarter of 2010, we provide a more recent picture of the returns to private equity, and examine the time-series properties of cash flows and returns with respect to macroeconomic fluctuations including three central features of 21^{st} century capital markets: the technology boom and bust from the late 1990s to 2002, the rising market valuations of 2003-2007, and the financial crisis and recession of 2007-2009. Because private equity investments are inherently illiquid, understanding the time series properties of private equity performance and cash flows is critical for understanding its behavior as an asset class.

Representativeness is a natural concern with data of this nature. Although our sample is the largest, and in many respects the only, of its kind, it is natural to ask whether our data are representative of the broad investment experience of the private equity industry as a whole, or whether they suffer from some sample selection bias. Of course, without knowledge of basic population parameters of the distributions of private equity performance and contractual terms, it is impossible to know whether any particular sample, including those available in commercial databases, is biased or unbiased. Clearly, our results should be interpreted with this caveat in mind. However, there are a number of reasons to think that sample selection bias is not a serious concern in our data. The data provider's overall portfolio grew over time as it acquired other institutions: during this process, distinct teams of smaller limited partners were joined together as one. The fact that the portfolio was assembled over time through a sequence of parent-company mergers that occurred for reasons unrelated to each company's exposure to private equity means that our sample is much broader (and more random) than it would otherwise be if it had been invested by a single limited partner. Our data set is also large relative to the universe of US private equity–we have over 50% of the Venture Economics (VE) universe of capital committed to U.S. buyout funds, and almost 40% of the overall VE U.S. private equity universe, during our sample period. Nevertheless, our coverage of venture capital, distressed debt funds, and funds-of-funds is significantly less comprehensive than our buyout and real estate coverage. For this reason, we break our analysis out by investment category whenever possible.

We present our findings in three steps. First, we offer evidence on the average performance of private equity funds, and the extent of cross-sectional variation in performance. Second, we examine the time-series and cross-sectional determinants of the terms of the management contract between GPs and LPs, and connect these terms and other fund characteristics to cross-sectional variation in fund performance. Finally, we study how private equity fund performance varies in the time-series, in particular with respect to market conditions when a fund is raised, and analyze the sensitivity of capital calls and distributions to macroeconomic factors, including the recent financial crisis and recession.

Our main findings are as follows:

- On average, the private equity funds in our sample have outperformed the S&P 500 on a net-of-fee basis by about 15% over the life of the fund. This is especially true of buyout funds, where our data coverage is greatest: buyout funds in every vintage year since 1992 have outperformed the S&P, often by more than 25%. This translates into annualized excess performance of around 1.5-2.5% per annum. We also find large differences in performance across fund types and over time.

- Most funds charge an annual management fee of 1.5%, 2%, or 2.5%, and a carried interest of 20%, consistent with Gompers and Lerner (1999) and Metrick and Yasuda (2010). However, there is important variation in fee and carry terms in the cross-section and over time. Larger funds charge lower management fees but obtain higher carried interest. These results suggest that differences in GP compensation reflect differences in GP ability, with more able GPs (who raise larger funds) earning higher variable compensation, consistent with Gompers and Lerner (1999). Fund size, management fees, and carried interest vary over the economic cycle in different ways for different types of funds. Buyout and real estate funds grow by more during the boom of the mid-2000s than VC funds do during the boom of the late 1990s. Controlling for fund size, management fees increase during boom periods, so the average fund raised in boom times is both larger and charges a higher management fee compared to other times. Carried interest in VC funds rises during the VC boom, but this operates through the tendency for larger VC funds to receive higher carry. In contrast, controlling for fund size, carried interest in buyout funds is lower during the buyout boom of the mid-2000s. Taken together, these results suggest that the fixed/variable mix of GP compensation shifts to fixed components during fundraising booms, consistent with increased GP bargaining power in those times (and a preference for fixed compensation). The results also suggest that inherent differences in the scalability of the investment technology across fund types is important for understanding how fund size and compensation terms vary over the economic cycle.

- GP capital commitments are often 1% of fund size: 42% of funds have a GP commitment of approximately 1%, with 22% below a 1% commitment and 37% above. Larger funds are more likely to have a GP capital commitment above 1%, exactly the opposite of what mechanical explanations would predict. Controlling for fund size, GP capital commitments increase during the buyout boom of the mid-2000s, but there is no such effect for VC or real estate funds. These facts suggest that LPs are concerned about GP incentives in large funds (and, for buyout funds at least, during boom periods), and accordingly are more likely to require above-normal GP capital commitments to help align incentives. These results, and those for GP compensation, are consistent with the view of Axelson, Strömberg, and Weisbach (2009) that agency considerations are a key determinant of the organization of private equity funds.

- Net-of-fee performance is *not* related to management fee and carry terms. This means that on average, GPs with higher fees and carry earn them in the form of higher gross-of-fee returns. These results stand in marked contrast to the mutual fund literature, which finds that higher mutual fund fees translate into lower net-of-fee returns to investors (e.g., Carhart, 1995; Fama and French, 2010).

- There is some evidence that lower GP capital commitments are associated with higher fund performance. This speaks against an asymmetric information/signaling explanation for variation in the component of GP capital commitments that is not explained by fund size, and in favor of an explanation in which higher quality general partners can commit lower amounts of their own capital, which they may desire for diversification reasons.

- Consistent with Kaplan and Schoar (2005), we find a positive, concave relation between fund size and performance, particularly for VC funds. We also find strong evidence of performance persistence, particularly for buyout funds.

- There are important differences between performance measurements based on IRRs and PMEs, both in terms of performance assessments based on levels, and in terms of their time-series properties. The two measures are highly correlated in the cross-section, and thus largely interchangeable in cross-sectional analysis. But they differ markedly in the time-series. In particular, funds raised during hot markets underperform in terms of IRR, but not in terms of PME. That is, times of high capital inflows to private equity are followed by low IRRs, consistent with Kaplan and Strömberg (2009), but not low PMEs. We also find that IRR underperformance in hot markets is driven by larger funds.

- The difference between IRRs and PMEs is clearly related to the presence of economy-wide fluctuations, and the correlation between these fluctuations and cash flows in and out of private equity. Capital calls and distributions are both more likely and larger when public equity valuations rise (i.e., when the S&P 500 price/dividend ratio increases) and when liquidity conditions tighten (i.e., when the TED spread widens). The evidence is not supportive of the view that private equity is a liquidity sink, at least insofar as liquidity is captured by the TED spread: distributions and calls are roughly equally sensitive to the TED spread. In contrast, distributions are considerably more sensitive to public equity valuations than calls are, implying a positive correlation between private equity returns and public equity returns. This correlation in turn helps explain difference in performance inferences between IRRs and PMEs. Moreover, the difference between the sensitivities of distributions and calls to public equity valuations is larger for VC funds than for buyout funds, suggesting that VC investments have higher market betas than buyout investments, which is consistent with recent work demonstrating high betas for venture portfolio companies (Korteweg and Sorenson, 2010).

- The financial crisis and ensuing recession of 2007-2009 had two effects on private equity cash flows. Both calls (weakly) and distributions (strongly) drop during the crisis. However, the component of calls not explained by by public equity valuations and the TED spread strongly spike during the crisis, and the sensitivity of calls and distributions to public equity valuations and the TED spread change considerably. The spike in unexplained calls suggests a greater liquidity demand by private equity funds, consistent with an increase in attractive investment opportunities and (for buyouts) a greater need for equity capital given the difficulty in obtaining debt financing. The drop in distributions is consistent with the general lack of liquidity in the IPO and M&A markets, and corresponding lack of exit opportunities, during the crisis.

Our results contribute to the literature on the performance, risk, and contractual features of the private equity industry. Our analysis is particularly related to prior work making use of private equity cash flow data. Kaplan and Schoar (2005) and Phalippou and Gottschalg (2009) use cash flow data from Venture Economics to assess the performance of private equity funds. Jones and Rhodes-Kropf (2003), using similar data, focus on understanding whether the idiosyncratic risk of private equity funds translates into higher returns. Ljungqvist, Richardson, and Wolfenzon (2007) use a different sample of private equity funds for which they have data on cash flows to and from portfolio companies as well as to and from LPs. Their focus is on understanding how the characteristics of portfolio companies and the timing of investments vary across funds and over the lifecycle of a fund. Because we lack data on the underlying portfolio companies for our sample of funds, we cannot investigate these and similar issues. In all of these papers, the cash flow data does not extend beyond 2003, and is largely limited to funds with vintage years prior to 1995, so our work builds upon and extends theirs in important directions.

Also closely related are two papers that examine the contractual terms governing the compensation of venture capital and buyout GPs. Gompers and Lerner (1999) examine 419 VC funds raised between 1979-1992. They find that VCs with better reputations obtain higher carried interest and lower management fees, and that compensation terms are unrelated to performance measured by the fraction of portfolio companies that eventually go public. Our findings are consistent with theirs. Metrick and Yasuda (2010) estimate the expected revenue to GPs using data on the compensation terms of the management contracts for 238 venture capital and buyout funds. Their data do not include any performance information.

The remainder of the paper proceeds as follows. Section II describes the data. Our findings are then presented in three steps. First, Section III offers evidence on the average performance of private equity funds, and the extent of cross-sectional variation in performance. Second, Section IV examines the time-series and cross-sectional determinants of the terms of the management contract between GPs and LPs, and connect these terms and other fund characteristics to cross-sectional variation in fund performance. Third, Section V provides an analysis of the time-series, focusing on time-series variation in fund performance, particularly with respect to market conditions at the time of fundraising, and analyzes the propensity of funds to call and distribute capital in response to market conditions, including the recent financial crisis and recession. Section VI discusses the implications of this work and concludes.

II. Data and Sample Construction

Our analysis uses a confidential, proprietary data set obtained from a large, institutional limited partner with extensive investments in venture capital, real estate, and buyout private equity funds. In total, there are 990 funds in our sample, representing over $677 billion in committed capital spanning 1984-2009, or over 30% of the total capital committed to private equity funds over the same time period (data from Venture Economics). While are data certainly do not exhaust the entirety of the private equity investment spectrum, there are a number of features of our data which make it unique and ideally well suited to understanding private equity cash flows, performance, and contractual arrangements.

First is the level of detail and breadth of data items. Our data allow us to track capital calls, distributions, and estimated market values at the quarterly frequency throughout the life of the fund. In addition, the data cover the key parameters that govern the management contract between the limited and general partners. In addition to the management fee and carried interest that the general partners earn as compensation, our data are unique in that they include information on the general partners' own investment in the fund. Our sample of management fee and carry data is both larger and more recent than those of Gompers and Lerner (1999) and Metrick and Yasuda (2010). Our dataset is the first to contain information on both the management contracts and cash flow performance. The definitions and further details of these data items are summarized in Table 1, which defines the key variables in our raw data. As Table 1 illustrates, we have data on the fund sequence number, fund size, the general partner's capital commitment as a fraction of total committed capital, the management fee and the carried interest for 990 funds. We have capital calls, distributions and market values at the quarterly level, comprising over 41,000 quarterly time-series observations. The data are anonymized so we do not know the identity of the GPs or the names of the funds.

The second feature is the time span that our data cover, 1984-2010. A number of papers have used cash flow data to study the behavior of either private equity or buyout funds in the past, but these papers focus on funds with vintage years prior to 1995, with cash flows ending in 2003 or before. Our cash flow data extends to the second quarter of 2010. Although the earliest funds in our sample have vintage years going back as far as 1984, around 2/3 of our liquidated sample of funds (a total of 632 funds; see below) have vintage years of 1995 or later. Most of our knowledge of the economics of the private equity market is based on analysis of funds with vintage years prior to ours. Thus, our findings provide a natural complement to existing results.

The third noteworthy feature of our data is the way in which the sample of funds was assembled and the fact that, because the data are provided directly from the LP's internal accounting system, there is no question of the self-reporting or survivorship biases that are an important concern in commercial private equity databases. The data provider engaged in a number of acquisitions in the 1990s which led it to acquire a large portfolio of private equity investments. The acquisitions were not motivated by a desire to assemble a private equity portfolio with particular characteristics, but rather for reasons stemming from other lines of the limited partner's operations. This means that the resulting assembly of investments represents essentially a random collection of private equity investments made by a pool of distinct private equity limited partners who were joined together for reasons that were orthogonal to their investment strategies. For this reason, our sample is perhaps more representative of the overall private equity universe than it might otherwise be if it reflected the investment theses of a single group of unified limited partners.

The characteristics of funds in our sample are presented in Table 2. As noted above, the 990 funds in our sample represent over $677 billion in committed capital. This figure is around 30% of the total capitalization of the Venture Economics (VE) universe of the same fund types over the 1984-2010 time frame. Restricting attention to U.S. funds only, we have 39% of the total capitalization of the private equity universe covered by VE. Coverage varies significantly by fund type. Our data include only $61 billion in committed venture capital, or around 16% of the VE universe of U.S. funds, while the real estate fund sample comprises over 65% of the U.S. VE universe. Importantly, we have 542 buyout funds, for a total capitalization of $535 billion, representing 56% of the total capitalization of the VE U.S. buyout universe over the 1984-2010 sample period.[1]

In spite of the concerns raised by Harris, Jenkinson and Stucke (2010) regarding the representativeness of commercially available private equity databases, another way to gauge our data is to compare the number of funds and IRR performance of our sample to the number of funds with performance information inleading commercial databases, such as VE, Preqin or Cambridge Associates (CA). These vendors primarily focus on venture capital and buyout funds. Our data contain roughly as many buyout funds as the number for which fund-level IRR information is available on VE, Preqin, or CA over the same time period. Hence our coverage of buyout funds compares well to commercial sources. As noted above, our coverage of VC funds is less comprehensive; our data comprise about one-third of the number of VC funds for which Preqin has fund-level IRR information but only around one-fifth of the counts in the VE and CA data. In terms of performance measurements, there is no significant difference between the time-series cross-sectional mean IRRs from our data and the VE or Preqin (CA does not report information on average performance across funds).

[1] Note that VE has performance information for only a subset of the funds included in the fundraising data from which total capitalization is computed.

However, in a cross-sectional analysis, which has more power, we find evidence that our sample of VC funds have lower IRRs than those in either VE or Preqin, but there remain no significant differences for buyout funds. In any case, because summary statistics from VE, Preqin, and CA differ systematically from one another (Harris, Jenkinson and Stucke, 2010), is impossible to know whether any differences are a function of self-reporting and survivorship biases that creep into commercially available data sources, whether they reflect characteristics of the LP/GP matching process in the private equity capital market (Lerner, Schoar, and Wongsunwai, 2007), or whether they are evidence of sample selection bias in our data. Clearly, our results should be interpreted with this in mind.

On average, 35% of our funds are first funds. 23% are second funds raised by a firm, and 15% of the funds are third-sequence funds. These numbers suggest that our sample is broadly consistent with the sample used in Kaplan and Schoar (2005), who provide important evidence on the issue of fund persistence and the relation of performance to size. We provide a complementary analysis below.

Because many of the funds in our sample have recent vintage years and are still active, we also present summary statistics for the sample of funds that were either officially liquidated as of 6/30/2010, or had no cash flow activity for the last six quarters of the sample and had vintage years prior to 2006. This is called the "Liquidated Sample," and this sample necessarily forms the basis of much of our performance assessment, because we wish such assessments to be based on actual cash flows. This sample includes about two-thirds of all funds in the total sample, and represents about half of the total committed capital in the full sample. Nevertheless, the composition of first, second and third funds is roughly equivalent across the full sample and the liquidated sample. The mean fund size is smaller by some $150 million in the liquidated sample, but this is largely a function of the growing prevalence of large funds in the post-2006 vintage portion of the sample. Scanning across the columns in Table 2 indicates that this is driven by large differences in average size of buyout funds and real estate funds across the two samples.

Table 3 provides summary statistics on the compensation and GP capital commitments data that we have. Our sample of funds with management fee and carry data is both larger and more recent than either Gompers and Lerner (1999), which only covers venture funds, and Metrick and Yasuda (2010) which covers only venture and buyout funds. No prior work has any data on fee or carry terms for real estate, distressed debt, or funds-of-funds. Moreover, no prior work has had access to data on the percentage capital committed by general partners.

The full and liquidated samples look similar to one another in terms of the average or median values of fees, carried interest, and GP ownership percentages. These confirm the "2 and 20" conventional wisdom: namely, the median initial management fee is two percent, while the median carry is equal to twenty percent. The median GP capital commitment is is one percent of fund size, while the average is a full percentage point higher, indicating that while it is in some sense standard for general partners to post 1% of total committed capital, a significant fraction of GPs find it either necessary or optimal to invest larger stakes in their funds.

There is relatively little cross-sectional variation in carried interest. What variation does exist is largely in venture funds, and to a lesser extent in buyout funds. This evidence is consistent with Gompers and Lerner (1999) and Metrick and Yasuda (2010).

In contrast, there is a fair amount of variation in initial management fee, both within funds of a given class as well as across fund classes. Management fees are higher in venture than in buyout, which is consistent with the widely held view, stemming from Kaplan and Schoar (2005) and others, that constraints in the number of investment opportunities in venture, and differences in access to these investment opportunities, are fundamental for understanding compensation practices.

There is also a considerable amount of variation in the percentage amount of GP ownership. Across fund classes, around 42% of all funds have GP ownership levels of approximately one percent. Overall, 22% GP commitments were below one percent, with the highest concentration occurring in distressed debt funds, and the lowest fraction occurring in venture. Around 37% of all funds had GP ownership levels over 1% of total committed capital, with higher proportions in real estate and buyout and the lowest proportions in venture and funds-of-funds. One potential explanation for the variation we observe is that GPs signal their effort or ability through their ownership, which through Leland and Pyle (1977) type arguments would require greater ownership stakes for funds that were more correlated with overall market conditions. We study this and other possible explanations in greater detail in Table 8 where examine the cross-sectional determinants of these variables.

Market conditions in the private equity markets vary considerably during our sample period. Market conditions have a pronounced effect on fund size, as suggested by comparing average fund sizes for the liquidated and full samples in Table 2. This fact is especially important for understanding the ultimate dollar values of GP compensation and capital commitments, because the key features of GP compensation are typically proportional to the size of assets under management. To explore the connection between market conditions and fund size more carefully, Table 4 presents cross-sectional fund-level OLS estimates of the relation between log fund size and market conditions at the time the fund was raised. The two key variables are "Industry Flows" and "Adjusted Industry Flows." The variable "Industry Flows" measures the natural logarithm of committed capital to an asset class at a point in time. To construct this measure, we use Venture Economics data to compute the total amount of committed capital to a fund type in a given vintage year. For "Adjusted Industry Flows" we divide Industry Flows by the total US stock market capitalization at the end of the vintage year (data from CRSP) to better capture the relative size of private capital fundraising. Thus, since the regressions are cross-sectional, these specifications essentially replace a (vintage year × fund type) fixed effect (i.e., dummy variable) with the level of committed capital to that fund type in that vintage year. The variables "VC boom", "Buyout boom", and "Real estate boom" are indicator variables for whether the fund was raised during 1997-2001, 2005-2008, or 2004-2008, respectively, the respective boom periods in fundraising activity reported by Venture Economics.[2] Interacting the respective boom

[2]Though the booms in VC, buyout, and real estate performance ended somewhat earlier, roughly around the time of the technology bust and collapse of the Nasdaq in 2000 for VC, and around the oset of the financial crisis in 2007 for buyout and real estate, respectively, capital commitments to GPs appear to have reacted to these events with a lag. This lag reflects at least in part the fact that there is often a delay between

dummies with the same fund type dummies allows us to study the extent to which each type fund raised more money on average during its respective boom.

As Column (1) of Table 4 shows, the average fund size grows significantly when industry fund raising is higher. A ten percent change in total fundraising volume in a given vintage year results in a three percent larger *average* fund size. The omitted fund-type is venture funds, therefore the buyout, real estate, distressed debt, and fund-of-funds dummies in Column (1) echo the average fund size measures from Table 2.

Column (2) replaces Industry Flows with Adjusted Industry Flows and repeats the analysis. The results are very similar to those reported in Column (1). This shows that the relation between fund size and fundraising is robust to the fact that overall market conditions were strong during times when private capital fundraising was high.

Column (3) omits distressed debt and funds-of-funds and repeats the analysis of Column (1) focusing on the interaction of the boom period interaction variables. The column shows that the most dramatic scaling of average fund size occurred among buyout funds during the buyout boom of 2005-2008. Buyout funds raised during this period were essentially twice the size of buyout funds raised during non-boom periods. VC funds and real estate funds also grew in average size during their respective boom periods, but not by nearly the same degree. This supports the widely held view that, at least in venture, fund size is naturally more limited by the difficulty of deploying large amounts of capital for early stage firms.

III. The Performance of Private Equity Funds

This section and the two that follow it provide a discussion of our main results. We begin in this section by presenting average performance statistics, both in the aggregate and across different vintage years. In the next section we examine cross-sectional determinants of performance, controlling for these vintage year effects. Then in Section V we explore how time-series variation both in sector-level fund-raising and in broader macroeconomic

the timing of capital commitments (and negotiation of deal terms) and the actual start dates (vintage years) of funds.

variables affects the behavior of the underlying cash flows that are responsible for generating performance.

A. Aggregate Performance

We begin with an analysis of the aggregate ex-post performance of our sample of private equity funds, and compare it to the performance of the S&P 500, following Kaplan and Schoar (2005). For this analysis, we rely on the sample of liquidated funds described in Section II, so that our inferences about performance are based on the actual cash flows of the fund. We report performance at the fund level in two ways: (1) the IRR of the funds, which we (not our data provider) calculate from quarterly fund-level cash flows; and (2) the public market equivalent (PME) of the funds.

We calculate PME by discounting all cash outflows from the fund (distributions) using the total return of the S&P 500 as the discount rate, and summing each discounted outflow to obtain the total discounted outflows from the fund. We similarly calculate the total discounted inflows (capital calls) to the fund. The ratio of the total discounted outflows to the total discounted inflows is the PME, and reflects the net-of-fee return to private equity investments relative to public equities. A PME of 1.0 means that the fund exactly matched the performance of the S&P 500 over its life; in other words, a PME of 1.0 means that the LP would have received exactly the same total return had she, instead of investing in the private equity fund, invested all capital calls in the S&P 500 and liquidated these investments following the distribution schedule of the private equity fund. A PME of 1.10 (0.90) means that the LP received 10% more (less) dollars from investing in the private equity fund compared to investing in the S&P 500. The PME is therefore a useful measure of performance for LPs who are interested in knowing whether investments in private equity outperform investments in public equities. At the same time, the PME is unlikely to be a measure of the true risk-adjusted returns to private equity funds (whether PME understates or overstates true risk-adjusted returns depends on whether the beta of private equity funds is less than or greater than one)[3]

Table 5 reports statistics on aggregate IRR and PME, calculated from net-of-fee cash flows, by fund type for the full sample of liquidated funds. Several conclusions emerge.

The average (median) equal-weighted fund IRRs are 11% (8%) for all funds taken together, 9% (2%) for VC funds, 12% (10%) for buyout funds, 12% (11%) for real estate funds, 6% (5%) for debt funds, and 22% (25%) for funds-of-funds. On an IRR basis, therefore, the funds in our sample underperform those in the older sample (consisting almost entirely of funds started before 1995) studied by Kaplan and Schoar (2005), who report aggregate average (median) IRRs of 17% (11%) for VC funds and 19% (13%) for buyout funds.

When examining PMEs, however, this conclusion reverses. The VC and buyout funds in our sample have an average (median) PME of 1.03 (0.81) for VC funds and 1.20 (1.10) for buyout funds, substantially greater than the PMEs of 0.96 (0.66) for VC funds and 0.97 (0.80) for buyout funds in Kaplan and Schoar's sample. Thus, unlike in Kaplan and Schoar's (2005) earlier sample, the more recent private equity funds in our sample have on average beaten the S&P 500 over the sample period, even net of fees.[4] Table 5 shows that other fund types display average PMEs above one as well.

The fact that IRRs are lower and yet PMEs are higher in our sample compared to that of Kaplan and Schoar (2005) reflects differences in the return to the S&P 500 over the sample periods (and potentially different timing of calls and distributions with respect to the market movements as well). These results clearly illustrate the potential for misleading conclusions using fund-level IRRs and highlight the importance of the cash flow data which enable us to calculate market-adjusted returns.

Table 5 also shows that there is wide dispersion in the returns of individual funds, and that the extent of the dispersion varies across different types of funds. VC funds display the most dispersion measured by the within-type standard deviation of PME (0.95, compared

[3]There is no clear consensus in the literature on the true alphas and betas of private equity investments, which are very difficult to measure given the lack of objective interim market values and infrequent return observations. See Cochrane (2005) and Korteweg and Sorensen (2010) for a discussion of the issues involved.

[4]We find similar PMEs as Kaplan and Schoar (2005) do when considering only their sample period. This finding is another indication of the representativeness of our data.

to 0.71 for buyout funds). The interquartile PME ranges are about 0.6 for all types of funds except fund-of-funds, which display less dispersion because they are by nature more diversified. Although the average funds in our sample outperform the S%P 500, a substantial fraction do underperform.

In Table 5, size (committed capital)-weighted IRR and PME measures are similar on average and at the median to equal-weighted measures. If anything, size-weighted performance is lower than equal-weighted performance. This is particularly true for VC funds. These findings suggest that Kaplan and Schoar's (2005) finding that larger funds outperform smaller ones has weakened over time. We address this issue in more detail in Section IV.

Finally, Table 5 shows that VC funds, as a group, have lower returns than other types of funds over the sample period. This contrasts with Kaplan and Schoar (2005), who find that VC funds outperform buyout funds on a size-weighted, PME basis. As we show in the following sections, this reflects the poor returns of VC funds, particularly of large VC funds, started in response to the capital inflows following the technology boom of the late 1990s, which Kaplan and Schoar's (2005) sample period does not cover.

B. Aggregate Performance over Time

The overall performance of private equity funds reported in Table 5 masks a great deal of variation in the returns to funds started at different points in time. To illustrate, Table 6 displays size-weighted average fund-level performance by vintage year for our sample of liquidated funds. The large extent of time-series variation is evident in Table 5. Of particular importance is the sharp decline in the returns of VC funds started between 1999-2002 compared to earlier in the 1990s. Table 5 is also suggestive of higher returns to buyout and real estate funds started in 2002-2004, a period that represents the fundraising trough following the recession of 2002 and the beginning of the buyout and real estate booms of the mid-2000s. Also of note is that fact that these patterns for buyout and real estate funds are more pronounced in IRRs than in PMEs. We explore these and related time-series patterns in performance in greater detail in Section V.

C. Correlation between IRR and PME

The analysis so far, including both the comparison of our aggregate performance results to those of Kaplan and Schoar (2005) and the patters in performance by vintage year, suggests that conclusions about performance the time-series can differ markedly depending on whether IRRs or (more appropriately) PMEs are used to measure performance. Intuitively, IRRs do not control for the variation in private equity performance that stems from broader market conditions. In contrast, PMEs account for market variation as summarized by the return of the S&P 500.

These observations raise the question of how useful IRRs are likely to be for evaluating performance in the cross-section of funds, as opposed to the time series. We find that in the cross-section of liquidated funds, final or ex-post IRR and PME have a correlation coefficient of 0.79. This high correlation, although somewhat lower than the 0.88 reported by Kaplan and Schoar (2005), suggests that IRRs are likely to lead to similar inferences as PMEs when used to answer questions of a cross-sectional nature (and when controlling for time effects).[5] Consistent with this, the conclusions we draw from the cross-sectional analysis in Section IV below are largely unaffected if we analyze IRRs rather than PMEs. However, in Section V we provide further evidence that IRRs and PMEs can lead to markedly different conclusions in the time series.

[5] We also find high correlations between final performance measures and measures of interim fund performance. The cross-sectional correlations between final IRR and 5-year IRR and total value to paid in capital (TVPI) are, respectively, 0.83 and 0.74. The correlations between PME and 5-year IRR and 5-year TVPI are 0.71 and 0.74, respectively. 5-year IRR and 5-year TVPI have a correlation of 0.90. Kaplan and Schoar (2005) and Chung, Sensoy, Stern, and Weisbach (2010) report similarly high correlations (the latter using IRRs only).

IV. The Cross-section of Private Equity Fund Terms and Performance

In this section, we turn to an analysis of the cross-sectional determinants of private equity contractual terms and performance.

A. The Cross-section of Private Equity Fund Terms

We begin with a cross-sectional analysis of the determinants of the terms of the management contract between GPs and LPs. This analysis uses the full sample of private equity funds. Table 7 relates the carried interest and initial management fee, which together determine the GP's compensation from running the fund, to economic conditions and other observable fund characteristics at the time of fundraising.

A.1. GP Compensation

In Panel A of Table 7, we analyze the determinants of carried interest. Panel A includes only on VC and buyout funds because, as shown in Table 3, there is virtually no variation in carried interest in our sample for other fund types. As explanatory variables, we include fund size, sequence number, and indicator variables for whether the fund was raised during the VC and buyout fundraising booms of the last decade interacted with indicator variables for the respective fund types.

Columns (1)-(3) focus on VC funds only, while Columns (4)-(6) report results from buyout only. Column (1) of Panel A shows that VC funds raised their carried interest percentages in the VC boom, but by comparing to Column (4) we see that the same is not true for buyout funds during the buyout boom. Column (2) shows that the effect for VC funds during the boom operated through a size channel; during the boom, VC partnerships raised larger funds, and carried interest was not higher during the boom after controlling for fund size. In comparison, Column (4) shows that, controlling for fund size, buyout funds raised during the buyout boom actually received lower carry. Comparing Columns (2) and (3) with

(5) and (6) shows that the sequence number of the fund is a significant determinant of carry for VC funds, but not buyout funds. This is consistent with performance-persistence results in Kaplan and Schoar (2005), and shows that GPs are able to charge more on average for participation in later-sequence funds.

Columns (4) and (6) of Panel A shows that in the cross-section, fund size is positively related to carried interest, controlling for vintage year fixed effects. This result is stronger for venture than for buyout funds. As Gompers and Lerner (1999) point out, this positive relation is consistent with learning models in which LPs allocate more capital to GPs whom they perceive to have greater abilities to generate returns, and such high-ability GPs are able to charge higher performance-based fees.

In Panel B of Table 7, we analyze the determinants of the initial management fee, expressed as a percentage of committed or (very rarely) invested capital. Panel B includes venture, buyout and real estate for Columns (1)-(4), and all fund types for Column (5). Column (1) shows that buyout funds raised in the buyout boom obtain lower initial management fees, but the same is not true for VC or real estate funds. Column (2) shows that this result for buyout funds reflects the fact that larger funds obtain lower management fee percentages, and larger funds were raised during the boom. Controlling for size, all fund types received higher management fees during their respective boom periods, consistent with a relative increase in bargaining power for GPs relative to LPs during these times that carried over into determining fund terms as well as fund sizes. Column (4) of Panel B shows that the negative relation between fund size and initial management fee holds controlling for vintage year fixed effects. Finally, Column (5) extends the analysis to all funds, adding dummies for distressed debt and funds-of-funds. The coefficients on the fund type indicator variables show that, controlling for time effects and size, VC funds (the omitted category) have the highest management fees on average, followed by, in order, buyout, debt, real estate, and fund-of-funds.

Overall, Table 7 provides novel evidence that boom times in fundraising have an effect on the terms of the compensation contract that GPs obtain. This is consistent with anecdotal evidence but has not been systematically documented previously. Controlling for fund size, management fees increase on average for VC funds during the boom period of the late 1990s, and for buyout and real estate funds during their respective booms of the mid-2000s. Combined with the evidence that fund sizes are larger in boom periods (Table 4), this means that the average fund raised in boom times is both larger and charges a higher management fee than the average fund raised in other times. Carried interest in VC funds rises during the VC boom, but this operates through the tendency for larger VC funds to receive higher carry. In contrast, controlling for fund size, carried interest in buyout funds is lower during the buyout boom of the mid-2000s. Taken together, these results suggest that the fixed/variable mix of GP compensation shifts to fixed components during fundraising booms, consistent with greater GP bargaining power during booms and a preference for fixed compensation.

These results also suggest that inherent differences in the scalability of the investment technology across fund types is important for understanding how fund compensation terms vary over the economic cycle. In VC, the relative lack of scalability of the investment technology (investing in startups) limits growth in fund size, and GPs thus use their increased bargaining power to earn higher fees and carry per dollar of fund size (the latter by raising larger funds). In buyout funds, which are more scalable, GPs appear to be willing to sacrifice carry in boom times to raise larger funds, and in addition to earn higher management fees per dollar on this larger base of capital.

A.2. GP Capital Commitments

In Table 8, we study the determinants of GP capital commitments to the fund. As shown in Table 3, 42% of funds have a GP capital commitment between 0.99% and 1.01 %, or essentially 1%. Columns (1) and (2) of Table 8 accordingly focus on understanding the determinants of whether the GP commitment is less than, within, or greater than this range. Columns (1)-(2) report ordered probit estimates in which the dependent variable is equal to 0 if the GP commitment is less than 0.99%, 1 if it is between 0.99% and 1.01%, and 2 if it is greater than 1.01%. Columns (3)-(4) report probit estimates in which the dependent variable is 1 if the GP commitment is greater than 1.01% and 0 otherwise. Columns (5) and (6) use the natural log of the GP percentage if it is greater than 1.01 as the dependent variable. Columns (1), (3) and (5) include fundraising boom period indicator variables and focus on buyout, venture and real estate funds, while Columns (2), (4) and (6) include vintage year fixed effects and use all the funds in our sample.

Columns (1) and (3) show that during the buyout boom, buyout fund GPs were in fact more likely to contribute more than the 1% standard, whereas real estate GPs were less likely to do so during the real estate boom. There is no relation between VC GP commitments and the VC boom. In Column (5), however, we find no evidence that GPs in buyout funds pledged larger amounts of capital conditional on being over the 1.01% threshold. Thus, buyout funds were more likely to be above 1% in boom periods, but in general did not require larger amounts of capital from GPs.

Column (2) and (4) also show that, controlling for vintage year fixed effects, the GPs of larger funds are in fact more likely to contribute more than the standard 1%, the opposite of what mechanical explanations driven by wealth constraints would imply. Comparing to Column (6), however, we see that conditional on being above the 1% threshold larger fund size does not translate into larger fractions of GP capital committed.

Overall, the results in Table 8 suggest that LPs are concerned about GP incentives in large funds (and, for buyout funds at least, during boom periods), and accordingly are more likely to require above-normal GP capital commitments to help align incentives. These results, and those for GP compensation, are consistent with the view of Axelson, Strömberg, and Weisbach (2009) that agency considerations are a key determinant of the organization of private equity funds.

B. The Cross-section of Private Equity Fund Performance

We next turn to an analysis of the cross-sectional relations between final fund performance and fund characteristics, including the terms of management contracts analyzed in Tables 3, 7, and 8.

B.1. Performance, Persistence, and Fund Size

We begin by examining whether Kaplan and Schoar's (2005) cross-sectional findings of (1) a positive (concave) relation between performance and size, and (2) a positive relation between performance and the performance of the prior fund raised by the same partnership (persistence), continue to hold in our more recent sample.

Column (1) of Table 9 shows that, contrary to Kaplan and Schoar (2005), the natural logarithm of fund size is insignificant when entered linearly as an explanatory variable for final fund PME. However, Column (2) indicates that when the square of the natural logarithm of fund size is included as well, there is evidence of weakly positive and concave relation between performance and fund size. Column (3) shows that in our sample we find the same relation between PME and the sequence number of the fund as in Kaplan and Schoar (2005).

Columns (4)-(6) repeat this analysis but focus exclusively on venture capital funds. Among venture funds the fund size/performance relation is much more pronounced. The persistence result is just shy of statistical significance even though the coefficient is large in magnitude. This may reflect the relative small number of VC funds for which we have information on the prior fund's performance. When we focus exclusively on buyout funds in Columns (7)-(9), we see that the persistence effect is strong amongst buyout funds, although the size/performance relation is more modest.

Whether statistically significant or not, the coefficients on the key explanatory variables in Table 9 are all considerably smaller in magnitude than those reported by Kaplan and Schoar (2005). In untabulated results, we find stronger relations, comparable in magnitude to those of Kaplan and Schoar (2005), when we restrict attention to their sample period.[6] One possible explanation for these findings is that that the large inflows of capital to the private equity industry beginning in the mid-1990s, and therefore not reflected in their sample of funds, resulted in increased competition in the industry and associated "money chasing deals" that weakened the relation between size and performance and performance persistence.

[6]This finding is another indication of the representativeness of our data.

B.2. Performance and Fund Management Contract Terms

We next exploit another of the unique features of our data, the combination of information on fund-level realized returns (recall returns are net of fees) and information on fund management contract terms. We investigate whether a fund's final performance, as measured by PME, is related to the terms of the management contract. Table 10 presents our findings. Columns (1) and (2) show that there is no relation between PME and either the initial management fee percentage or the carried interest percentage. Column (3) shows that when we replace the carried interest percentage with indicator variables for whether the carried interest is greater than or less than 20%, we find some evidence that funds with carried interest lower than 20% underperform, and no relation with having a carried interest greater than 20%. The former result is, however, driven by eight buyout funds with low carry, and so we do not wish to overstate their importance.

Overall, the first three columns of Table 10 indicate no relation between the terms of GP compensation and ultimate net-of-fee fund performance. In particular, it is not the case that funds that charge higher fees underperform on a net-of-fee basis. This means that on average private equity funds with higher fees do in fact earn back those fees in the form of higher gross-of-fee returns. In untabulated results, we confirm that these (lack of) results hold for all fund types individually. These results differs sharply from analogous results for mutual funds, where it is well known that investors in mutual funds with higher fees see them show up intact in lower net-of-fee returns (e.g. Carhart, 1997). Our results suggest that differences in fees and carry charged by different private equity funds reflect differences in GP ability to generate gross-of-fee returns, and that the GP is largely able to capture the associated rents.

Columns (4)-(7) of Table 10 investigate the relation between final PME and the GP capital commitment. Column (4) shows that there is no linear relation. Columns (5)-(7), in contrast, show that funds in which the GP commits less than the standard 1% in fact have higher returns. This result is contrary to the predictions of models that consider costly signalling in the presence of asymmetric information. Applied here, the intuition from these models suggests that high-ability GPs would commit more capital to send a signal about ability. Instead, like the results on the determinants of compensation presented in Table 7, these results are consistent with symmetric information about GP ability. Under symmetric information, higher-ability GPs may choose to negotiate lower percentage capital commitments for themselves, conditional on fund size, which they may prefer for diversification reasons.

V. The Behavior of Private Equity Performance and Cash Flows over Time

In this section we turn to the final leg of our analysis, which is understanding the time-series properties of the cash flows in and out of the private equity funds, the timing and magnitude of which determine fund performance. Our analysis proceeds in two steps. First we demonstrate large differences in the relation between performance and capital flows to private equity funds based on whether we measure performance with IRRs or PMEs. Then we explore why this occurs by examining the co-movement of call and distribution behavior with macro variables.

A. Performance and Industry Capital Flows

In Table 11 we take up the question of how private equity fundraising conditions are related to future performance with cross-sectional regressions of fund performance on market conditions at the time the fund was initiated. The key independent variables are *ln (Industry Flows)* (the natural logarithm of fundraising by fund type and vintage year, from Venture Economics) and *Adjusted Industry Flows* (Industry flows divided by total stock market capitalization at vintage year-end). The latter is the variable used by Kaplan and Strömberg (2009), who find a negative relation between buyout fund IRRs and Adjusted Industry Flows using data from VE. These are also interacted with dummies for the fund-type specific size tercile in which the fund resides. The question that Table 11 explores is then whether capital raising predicts performance, and how this varies with size.

We begin with Panel A, which considers all fund types together. All specifications use equally weighted performance measures, but we measure performance in two ways. First, in columns (1) and (5), we measure performance with IRRs. Here we see that, across all funds, there is a negative and highly statistically significant relation between industry flows and performance, consistent with Kaplan and Strömberg (2009). In short, funds that are initiated in boom years have low performance, at least if performance is measured by IRRs. This holds both for adjusted and unadjusted industry flows.

What happens if we measure performance with PMEs instead (which requires cash flow data)? This answer is entirely different, as shown in Columns (2) and (6). Namely, there is no relation at all between capital raising and performance if we use a performance measure that deflates cash flows by returns available to a publicly investable index.[7] In short, funds that are initiated in boom years might have low performance, but in general the so does the market as a whole over similar time periods. Relative to the public market, private equity performance is no different in high fundraising years than in low fundraising years.

This result is important because it urges caution when applying the widely held view that returns are low following peak fundraising periods because increasing amounts of money are chasing ever-scarcer deals (see, for instance, Gompers and Lerner, 2000). Because we include fund-type fixed effects in all specifications in Panel A, the results cannot be attributable to relative performance across different fund types of a given vintage year.

We next consider how these conclusions vary in the cross-section of fund size. In columns (3), (4), (7) and (8), we repeat the analysis with industry flows interacted with size tercile dummies. There is no industry flow/IRR relation among the smallest funds of a given fund type when we examine unadjusted industry flows, but with adjusted industry flows we see modest negative performance among small funds growing monotonically with fund size. The fundraising/IRR relation is about 50% stronger (more negative) in the top size tercile than

[7] Note, too, that the R-squared values drop in half or more when we switch from IRRs to PMEs. This is because we are asking the same set of regressors to explain not only the returns to the private equity funds themselves, but also the returns to the index against which the private equity returns are benchmarked.

in the middle two terciles. This reveals that the overall relation between industry flows and subsequent IRRs is predominantly driven by the tendency of larger funds raised in peak fundraising years to deliver low IRRs going forward.

Note, however, that this relationship is again purely driven by the choice of an absolute performance measure. When we switch from absolute to relative performance and look at PMEs, the fund-flow/size/performance interaction largely vanishes, depending on which measure of fund flows we use. If we use unadjusted fund flows (column (4)), there is only a modest negative relation at the third tercile, significant only at the 10% level. And there is evidence that small funds outperform. If we switch to adjusted fund flows (column (8)), the negative relation is present for the third tercile but not for the first two. This in turn suggests that at least part of the absolute underperformance of the largest funds in each asset class is driven by the fact that the peaks in the private equity market are highly correlated with peaks in the overall economy, and that overall economic performance wanes as private equity performance also wanes. This can be seen both in the comparison of the IRR and the PME, and also by comparing adjusted and unadjusted fund flows: adjusted fund flows, which show the strongest flow/performance relation for PMEs, effectively separate private equity market conditions and public equity market conditions by deflating the former by the latter, and can be thought of as a measure of "abnormal" fundraising.

The results from Panel A of Table 11 indicate that if the returns to private equity are low following high fundraising years, then so are the returns to investable indexes outside of private equity. To ensure that this conclusion is not being driven by outliers, or by fund types that have not received attention in the prior academic literature, in Panel B we restrict attention only to venture funds, and in Panel C we restrict attention only to buyout funds. The results are similar in spirit to Panel A. The only statistically significant departure from Panel A is when we consider the relation between adjusted industry flows and PME-based performance for among venture funds in Column (6) of Panel B. This shows the same negative relation as found with the IRR, but column (8) shows this is driven by the performance of middle-sized funds. Compare Panels B and C also suggests that VC funds are more prone to underperformance compared to buyout funds following times of high fundraising. This is supportive of arguments the VC investments have higher market betas than buyout investments (Cochrane, 2005; Korteweg and Sorensen, 2010).

All in all, periods of high fundraising activity do not necessarily imply that returns going forward will be low because a glut of capital is chasing a dearth of investment opportunities in private equity. Rather, it appears that the periods of high fundraising activity presage broader market downturns. Clearly, failing to control for the systematic relations between private equity and broader market performance can lead to misleading inferences about the relative performance of private equity as an asset class.

B. Cash Flows and Macroeconomic Conditions

The analysis presented in the previous table indicates that private equity returns have a tendency to be low precisely when returns in other asset classes are low, and that this is driving the difference between IRR- and PME-based performance measurement. These patterns in turn suggest that understanding the timing of cash flows in and out of private equity is critical for understanding the performance of private equity funds relative to other investment opportunities.

In Table 12 we analyze the behavior of private equity capital calls over time. All specifications include fund type, fund age, and vintage year fixed effects, to control for differing unconditional propensities to call capital across funds of different types, ages, and vintage years. The unit of observation is a fund-calendar quarter, and all specifications include only fund-quarters for which there is some uncalled capital remaining. In Columns (1)-(5), the dependent variable is a dummy for whether a capital call occurs, and we employ simple linear probability models.[8] The specification in Column (1) adds time-period fixed effects. Estimating a model with a dummy for each quarter, along with fund type, fund age, and vintage year fixed effects, gives us a non-parametric theoretical upper bound on the explanatory power that we could hope to obtain from a model that included variables capturing

[8]Probit analyses yield qualitatively identical findings.

macroeconomic fluctuations. As we see from the R^2 in Column (1), the most we can hope to explain with time-series variables is about 17% of the total variation in call behavior. Most of call decisions are idiosyncratic across funds of a given vintage year and fund type at a given point in time.

Column (2) replaces the calendar quarter fixed effects with an extremely parsimonious description of the macroeconomic environment. First, we include the log of the Price/Dividend ratio on the S&P 500 (from Robert Shiller's website). Second, we include the log of the treasury-eurodollar (TED) spread (from Bloomberg). The first variable captures public market valuation levels, while the second captures liquidity conditions. When the TED spread is high, liquidity is tight. These variables allow us to examine how call behavior varies with valuation levels and liquidity conditions.

The loading on log(P/D) in column (2) indicates that funds are considerably more likely to call capital when valuations are high. Presumably this is a reflection of the fact that investment opportunities are plentiful when valuation levels are on the rise. At the same time, we see that the loading on the ted spread is also positive and significant, indicating that capital calls are more likely when liquidity conditions tighten. This in turn suggests a precautionary motive to call behavior.

The R^2 in column (2) is 16.3%, in comparison to the 17.6% reported in Column (1). The fact that a time-series model with only two variables achieves about 93% of the theoretical upper bound of a time-series model in our data suggests that we have indeed captured most of the explainable time-series movement in call activity with a highly parsimonious model of time-series fluctuations.

In column (3) we add the percentage of uncalled capital at the fund as a percentage of overall committed capital. Because we also include fund age fixed effects, interpreting this variable requires caution: the positive loading indicates that given two funds of exactly the same age, the one that has called less capital (and thus, by virtue of being the same age, has either encountered or acted upon fewer investment opportunities) is more likely to call capital in any given period. Holding this constant, however, we will still see that calls load positively on valuation and liquidity measures.

In column (4) we include a dummy for the financial crisis. This dummy equals one from 2007:Q3 to 2009:Q1, inclusive. It comes in with a weak negative sign. In column (5) we interact the financial crisis dummy with our time-series variables. Comparing columns (4) and (5) we see that although calls (weakly) declined during the crisis, the component of calls not explained by P/D and TED sharply spike, suggesting a greater liquidity demand by private equity funds, consistent with an increase in attractive investment opportunities and (for buyouts) a greater need for equity capital given the difficulty in obtaining debt financing. Indeed, holding constant the other variables, a capital call is about 50% more likely during the crisis period than before or after it. The fact that the loading on the crisis dummy is negative in Column (4) but positive in Column (5) indicates that on average, the recessionary environment (captured by P/D and TED) dominates the liquidity demand, and the overall effect of the crisis was to lessen call behavior.

The negative loadings on the crisis interaction terms indicate that the sensitivity of call behavior to underlying macroeconomic fluctuation dampened significantly during this period. That is, capital calls were less sensitive to macroeconomic during the crisis period than before the crisis period. Again, this supports the interpretation that the sensitivity of calls to macro conditions is a reflection of available investment opportunities outside the crisis period. The large call probability during the crisis reflects a precautionary motive, but as the underlying investment opportunities diminished, the sensitivity of calls with respect to macroeconomic fluctuation dampened.

Columns (6)-(9) study the magnitude of capital calls rather than their prevalence. Here the dependent variable is the natural log of (1 + called capital as a percentage of committed capital). Because both the dependent and key independent variables are in logs, the point estimates can be interpreted as the elasticity of capital calls with respect to market conditions.

Across the board, improving valuation levels predict larger capital calls. Market valuation levels and liquidity conditions are negatively correlated, but holding constant market valuation levels, we also see that tightening liquidity conditions predict larger capital calls. These magnitudes grow slightly when we hold constant the fraction of uncalled capital. When we hold constant macro factors and the fraction of uncalled capital at each fund, we see that the amount of capital called jumps in the crisis. During the crisis, the sensitivity of capital calls to valuation levels effectively vanishes, but sensitivity to liquidity conditions is largely unchanged.

As in previous tables, Panel A includes all funds, while Panel B repeats the analysis but restricts attention only to VC funds, and Panel C examines buyout funds. Comparing across panels, the differences are mostly in terms of magnitudes. In general, buyout funds experienced larger jumps in call probabilities and call sizes as a result of the crisis, but the sensitivity with respect to macroeconomic conditions during the crisis is also weaker. Buyout funds also exhibited substantially larger reductions in unconditional call activity around the economic crisis, even though the unexplained portion of call activity spikes more when holding constant macroeconomic variables. This suggests that both the recessionary and the liquidity channels were strongest for buyout funds.

Table 13 repeats the exact analysis conducted in Table 12 but switches the focus from capital calls to distributions of capital back to limited partners. As above, we include all funds in Panel A, VC funds in Panel B, and buyout funds in Panel C, and focus on linear probability models of distribution events in the first five columns, while focusing on distributions as a proportion of committed capital in the remaining four columns. As in Table 12, the unit of observation is a fund-calendar quarter, and all specifications include fund type, fund age, and vintage year fixed effects. All specifications further include only fund-quarters for which some capital has been called previously, so that a distribution is in principle possible.

As with calls, Table 13 indicates that distributions are positively related to P/D and the TED spread, and that these relations change in the crisis period. Similar to the result for calls, the sensitivity of distributions to the TED spread drops in the crisis, but in contrast to the result for calls, the sensitivity of distributions to P/D rises in the crisis. Comparing

Columns (4) and (8) in Table 13 to those in the previous table, we see that the crisis caused a drop in distributions whether or not we control for macroeconomic information contained in P/D and the TED spread. This is not surprising, since the recession channel and the liquidity channel work in the same direction for distributions, making them less likely. The drop in distributions is consistent with the general lack of liquidity in the IPO and M&A markets, and corresponding lack of exit opportunities (not fully captured by P/D and TED), during the crisis. Comparing Panels B and C of Table 13, we again see that the crisis had a more pronounced effect on the cash flow behavior of buyout funds compared to VC funds.

Comparing the magnitudes of the point estimates in Tables 12 and 13 also allows us to get a rough sense of the liquidity properties of private equity. Comparing Columns (6) and (7) for all funds (Panel A) across the tables, the elasticities with respect to calls are larger than those with respect to distributions, indicating that on balance private equity is a liquidity sink. However, when we include the crisis dummy in column (9) we see that this is almost entirely due to the effect of the financial crisis. During the crisis, unexplained calls surged in both number and size, while distributions plummeted in both number and size. Outside the crisis, there is little evidence that private equity is a liquidity sink. If anything, private equity funds tended to disburse slightly more than they called as liquidity conditions tightened in non-crisis periods.

Comparing the magnitudes of the point estimates on ln(P/D) in Tables 12 and 13 also shows that distributions are more sensitive to public market valuations than calls are, implying a positive correlation between private equity returns and public equity returns. This in turn helps explain difference in performance inferences between IRRs and PMEs. Moreover, as we see from Panels B and C of Tables 12 and 13, the difference between the sensitivities of distributions and calls to public equity valuations is larger for VC funds than for buyout funds, suggesting that VC investments have higher market betas than buyout investments, which is consistent with recent work demonstrating high betas for venture portfolio companies (Korteweg and Sorenson, 2010).

VI. Discussion and Conclusion

This paper uses a large, proprietary database of private equity cash flows, comprising close to 40% of the U.S. Venture Economics universe from 1984-2010 to provide the most comprehensive and up-to-date account of private equity performance, management contract terms, and cash flow behavior available in the academic literature to date. The timeliness of the data and the depth of information at our disposal allow us to draw important conclusions about the behavior of this asset class over time, including the VC boom of the late 1990s and bust of the early 2000s, the buyout and real estate booms of the mid-2000s, and the financial crisis and recession of 2007-2009.

Because we have complete cash flow data, we can construct Public Market Equivalents (PMEs) rather than rely simply on IRRs for our performance assessments. PMEs explicitly account for the timing of cash flows in and out of funds by discounting cash flows using the return of public equities, whereas IRRs simply compute the implied return earned on the capital put into the fund. Put differently, IRRs do not account for the opportunity cost of capital at the time it is called or distributed. Although the two measures have a high cross-sectional correlation, the distinction between absolute performance and performance relative to an investable index is critical for understanding the performance of private equity, both on average and over time. For example, we show that hot fundraising markets are followed by low IRRs, but not low PMEs.

As an asset class, our sample of private equity funds has performed well. Using PMEs, we find that on average, private equity has outperformed the S&P 500 by about 15% over the life of the fund during our sample period. Performance based on IRRs looks worse, but this reflects the fact that overall market conditions were poor during portions of our sample period. For example, buyout funds with 1999 vintage years earned a negative 3% IRR, but this is largely due to overall market conditions during their investment horizon: this vintage outperformed the S&P 500 by 22% over the funds' lives.

We also provide new evidence on the determinants of the GP-LP management contract, including GP compensation and capital commitments, and the relation between these contractual terms and fund performance. Larger funds earn lower management fees and higher carried interest, consistent with perceptions of GP ability being reflected in both fund size and compensation terms. During fundraising booms, percentage management fees increase and the fixed/variable mix of GP compensation shifts toward the fixed component, consistent with greater GP bargaining power and a preference for fixed compensation. Larger funds require larger amounts of GP capital, perhaps reflecting incentive concerns. Management fees and carried interest are unrelated to net-of-fee performance, suggesting that private equity GPs that receive higher compensation earn it in the form of higher gross returns. This result is in marked contrast to the that for mutual funds, in which net-of-fee performance is negatively correlated with management fees. We also find that funds with lower percentages of GP committed capital outperform relative to their peers. We also confirm the performance persistence and fund size/performance relations first documented by Kaplan and Schoar (2005), though the relations have weakened after their sample period.

Finally, the recency of our data allow us to address the behavior of private equity cash flows with respect to macroeconomic conditions. Capital calls and distributions are both more likely and larger when public equity valuations rise and when liquidity conditions tighten. Calls and distributions are roughly equally sensitive to liquidity conditions, but distributions are considerably more sensitive to public equity valuations than calls are, implying a positive correlation between private equity returns and public equity returns. This in turn helps explain difference in performance inferences between IRRs and PMEs. During the financial crisis and ensuing recession of 2007-2009, the tendency for calls to occur independent of measurable macroeconomic variables spiked, even though overall call activity dropped slightly. At the same time, distributions plummeted, and the sensitivity of calls and distributions to changes in underlying macroeconomic conditions changed considerably. These results suggest a greater abnormal liquidity demand by private equity funds, perhaps reflecting an increase in attractive investment opportunities, as well as a lack of exit opportunities during the crisis. Overall, our evidence on the timing of cash flows and distributions suggests that the time-series liquidity properties of private equity are largely driven by the presence and nature of underlying investment and exit opportunities.

References

[1] Axelson, Ulf, Per Strömberg, and Michael S. Weisbach, 2009. Why are Buyouts Levered? The Financial Structure of Private Equity Firms. *Journal of Finance* 64:1549-1582.

[2] Carhart, Mark M., 1997. On Persistence in Mutual Fund Performance. *Journal of Finance* 52:57-82.

[3] Chung, Ji-Woong, Berk A. Sensoy, Lea Stern, and Michael S. Weisbach, 2010. Pay for Performance from Future Fund Flows: The Case of Private Equity. Working Paper, Ohio State University.

[4] Cochrane, John, 2005. The Risk and Return of Venture Capital. *Journal of Financial Economics* 75:3-52.

[5] Driessen, J., T.-C. Lin, and L. Phalippou, 2007. A New Method to Estimate Risk and Return of Non-Traded Assets from Cash Flows: The Case of Private Equity Funds. Working Paper, University of Amsterdam.

[6] Fama, Eugene F. and Kenneth R. French, 2010. Luck versus Skill in the Cross-Section of Mutual Fund Returns. *Journal of Finance* 65:1915-1947.

[7] Gompers, Paul and Josh Lerner, 1997. Risk and Reward in Private Equity Investments: The Challenge of Performance Assessment. *Journal of Private Equity* 1:5-12.

[8] Gompers, Paul and Josh Lerner, 1999. An Analysis of Compensation in the U.S. Venture Capital Partnership, *Journal of Financial Economics* 51:3-44.

[9] Gompers, Paul and Josh Lerner, 1999. *The Venture Capital Cycle*. Cambridge, MA: MIT Press.

[10] Gompers, Paul and Josh Lerner, 2000. Money Chasing Deals? The Impact of Fund Inflows on Private Equity Valuations, *Journal of Financial Economics* 55:281-325.

[11] Harris, Robert S., Tim Jenkinson and Rudiger Stucke, 2010. A White Paper on Private Equity Data and Research. UAI Foundation Consortium Working Paper.

[12] Kaplan, Steven N. and Antoinette Schoar, 2005. Private Equity Performance: Returns, Persistence, and Capital Flows, *Journal of Finance* 60:1791-1823.

[13] Kaplan, Steven N., Berk A. Sensoy, and Per Strömberg, 2002. How Well Do Venture Capital Databases Reflect Actual Investments? Working Paper, University of Chicago.

[14] Kaplan, Steven N. and Per Strömberg, 2009. Leveraged Buyouts and Private Equity. *Journal of Economic Perspectives* 23:121-46.

[15] Korteweg, Arthur and Morten Sorensen, 2010. Risk and Return Characteristics of Venture Capital-Backed Entrepreneurial Companies. *Review of Financial Studies*.

[16] Leland, Hayne and David Pyle, 1977. Informational Asymmetries, Financial Structure, and Financial Intermediation, 1977. *Journal of Finance* 32:371-387.

[17] Ljungqvist, Alexander, and Matthew Richardson, 2003. The Cash Flow, Return and Risk Characteristics of Private Equity. Working Paper, NYU Stern School of Business.

[18] Ljungqvist, Alexander, Matthew Richardson, and Daniel Wolfenzon, 2007. The Investment Behavior of Buyout Funds: Theory and Evidence. Working Paper, NYU Stern School of Business

[19] Lerner, Josh, Antoinette Schoar and Wan Wongsunwai, 2007. Smart Institutions, Foolish Choices? The Limited Partner Performance Puzzle. *Journal of Finance* 62(2) 731-764.

[20] Metrick, Andrew, and Ayako Yasuda, 2010. The Economics of Private Equity Funds. *Review of Financial Studies* 23: 2303-2341.

[21] Phalippou, Ludovic and Oliver Gottschalg, 2009. The Performance of Private Equity Funds, *Review of Financial Studies* 22:1747-1776.

[22] Sahlman, William, 1990. The Structure and Governance of Venture Capital Organizations, *Journal of Financial Economics* 27:473-521.

Table 1: Data Overview and Variable Definitions

This table provides definitions to some common terms used for describing the management and performance characteristics of private equity funds. In the typical fund, limited partners (LPs) are passive investors whose investments are managed by general partners in the fund (GPs). The management agreement is typically specifies that the GPs earn a combination of management fee and carried interest, as described below.

Fund characteristics (990 funds in total)

Variable	Definition
Sequence number	The position of the fund in the partnership's sequence of funds.
Fund size	The total amount of capital committed to the fund, including commitments by both LPs and general partners GPs.
GP commitment	The percentage of fund size committed by the GP.
Management fee	The annual management fee earned by the GP, typically expressed as an annual percentage of funds committed (fund size) or invested (invested capital). In many cases this fee varies over time depending on how fully committed the fund's capital is.
Carried Interest	The percentage of fund profits that the GP keeps as compensation. Carried interest (also known as *carry*) is paid in addition to the management fee.

Cash flow and market value variables (41,238 quarterly observations through 6/30/2010)

Variable	Definition
Capital calls	LPs must contribute capital to the fund when called by the GP (rather than all at once), until their commitment is exhausted. Capital calls can include calls for management fees.
Distributions	When investments are realized, the proceeds (net of carry) are distributed to LPs.
Market value	The GP's assessment of the market value of unrealized investments.

Table 2: The Characteristics of Private Equity Funds

This table presents summary statistics for private equity funds in our sample, including venture capital (VC), buyout (BO), real estate (RE), debt (Debt), and funds of funds (FoF). Fraction of 1st, 2nd, and 3rd funds indicates the fraction of sample funds of that sequence number (position in a partnership's sequence of funds). Total Committed Capital is the aggregate amount of capital committed to our sample funds (i.e. the sum of the sizes of all sample funds). Total LP Capital and Total GP Capital indicate, respectively, the contributions of limited partners and general partners to this total. The % of VE universe is the total committed capital of the sample funds of a given fund type expressed as a percentage of the total committed capital to all funds of the same type reported on Venture Economics over the entire 1984-2009 sample period. The % of VE U.S. universe is the same but includes only U.S. sample funds and U.S. funds on VE. Fund Size is the committed capital of the fund. All dollar amounts are in millions of US dollars. Funds in the liquidated sample are those that had vintage years prior to 2006 and were liquidated as of 6/30/2010.

	All	VC	BO	RE	Debt	FoF
Full Sample:						
Number of Funds	990	295	542	73	43	37
Fraction of 1st Funds	0.31	0.25	0.32	0.30	0.65	0.22
Fraction of 2nd Funds	0.23	0.26	0.23	0.15	0.19	0.24
Fraction of 3rd Funds	0.16	0.15	0.16	0.14	0.14	0.19
Total Committed Capital	$677,557	$61,358	$535,485	$64,201	$9,088	$7,432
Total LP Capital	$663,340	$60,469	$525,276	$61,428	$8,803	$7,362
Total GP Capital	$14,217	$879	$10,209	$2,773	$285	$70
% of VE universe	30.1%	10.8%	41.6%	64.0%	9.4%	3.7%
% of VE U.S. universe	39.0%	15.9%	55.7%	65.9%	9.4%	5.0%
Mean Fund Size	$684.40	$207.96	$987.98	$879.48	$211.36	$200.88
Median Fund Size	$217.09	$106.12	$312.91	$505.00	$154.05	$149.50
St. Dev. Fund Size	$1783.73	$276.26	$2291.21	$1407.26	$219.17	$212.48
Liquidated Sample:						
Number of Funds	632	192	368	35	28	9
Fraction of 1st Funds	0.35	0.28	0.35	0.40	0.64	0.33
Fraction of 2nd Funds	0.23	0.23	0.23	0.20	0.21	0.44
Fraction of 3rd Funds	0.15	0.18	0.15	0.09	0.14	0.00
Total Committed Capital	$335,221	$37,126	$271,183	$20,806	$5,297	$806
Total LP Capital	$327,517	$36,609	$265,556	$19,383	$5,166	$800
Total GP Capital	$7,704	$517	$5,627	$1,423	$131	$6
Mean Fund Size	$530.41	$193.37	$736.91	$594.47	$189.21	$ 89.62
Median Fund Size	$175.00	$ 83.46	$266.72	$408.70	$136.77	$ 58.00
St. Dev. Fund Size	$1166.47	$284.51	$1467.87	$490.55	$234.85	$ 67.77

Table 3: Summary Statistics on GP Compensation and Capital Commitments

Panel A contains summary statistics on initial management fees, carried interest and GP capital commitments (expressed as a percentage of fund size) for the full sample of 990 funds. Panel B contains the same information for the sample of liquidated funds, those with vintage years prior to 2006 that were either officially liquidated by 6/30/2010 or had no cash flow activity for the six calendar quarters ending on 6/30/2010.

Panel A: Full Sample	All	VC	BO	RE	Debt	FoF
Initial Management Fee:						
Mean Initial Fee (% per year)	1.85	2.24	1.78	1.33	1.54	1.16
Median Initial Fee (% per year)	2.00	2.50	2.00	1.50	1.50	1.25
St. Dev. Initial Fee (% per year)	0.53	0.43	0.44	0.40	0.52	0.45
Fraction with:						
Initial Fee = 1.5%	0.23	0.05	0.25	0.65	0.50	0.12
Initial Fee = 2.0%	0.34	0.27	0.45	0.03	0.18	0.00
Initial Fee = 2.5%	0.18	0.47	0.07	0.02	0.00	0.00
Initial Fee Basis = Committed Capital	0.88	0.91	0.90	0.75	0.76	0.69
Initial Fee Basis = Invested Capital	0.06	0.04	0.05	0.17	0.11	0.08
Carried Interest:						
Mean Carry (%)	20.11	20.44	19.96	20.14	20.00	19.73
Median Carry (%)	20.00	20.00	20.00	20.00	20.00	20.00
St. Dev. Carry (%)	1.42	1.70	1.33	0.82	0.00	1.64
Fraction with Carry = 20%	0.95	0.89	0.97	0.97	1.00	0.97
Fraction with Carry < 20%	0.01	0.01	0.02	0.00	0.00	0.03
Fraction with Carry > 20%	0.04	0.10	0.01	0.03	0.00	0.00
GP Commitment:						
Mean GP Commitment (%)	2.36	1.78	2.38	4.35	3.88	1.04
Median GP Commitment (%)	1.00	1.00	1.00	1.04	1.00	1.00
St. Dev. GP Commitment (%)	5.90	5.09	5.73	8.74	8.44	1.16
Fraction with GP % $\in$ 0.99% - 1.01%	0.42	0.56	0.35	0.25	0.42	0.57
Fraction with GP % < 0.99%	0.22	0.18	0.23	0.23	0.26	0.32
Fraction with GP % > 1.01%	0.37	0.26	0.43	0.52	0.33	0.11

Panel B continued on next page

Panel B: Liquidated Sample	All	VC	BO	RE	Debt	FoF
Initial Management Fee:						
Mean Initial Fee (% per year)	1.86	2.24	1.75	1.19	1.50	0.85
Median Initial Fee (% per year)	2.00	2.50	2.00	1.50	1.50	1.00
St. Dev. Initial Fee (% per year)	0.55	0.46	0.47	0.40	0.55	0.53
Fraction with:						
Initial Fee = 1.5%	0.22	0.05	0.27	0.54	0.46	0.00
Initial Fee = 2.0%	0.34	0.26	0.42	0.00	0.19	0.00
Initial Fee = 2.5%	0.18	0.47	0.07	0.00	0.00	0.00
Initial Fee Basis = Committed Capital	0.86	0.89	0.88	0.62	0.73	0.80
Initial Fee Basis = Invested Capital	0.07	0.05	0.07	0.19	0.12	0.00
Carried Interest:						
Mean Carry (%)	20.15	20.44	20.01	20.14	20.00	20.00
Median Carry (%)	20.00	20.00	20.00	20.00	20.00	20.00
St. Dev. Carry (%)	1.33	1.84	1.08	0.85	0.00	0.00
Fraction with Carry = 20%	0.94	0.88	0.97	0.97	1.00	1.00
Fraction with Carry < 20%	0.01	0.02	0.01	0.00	0.00	0.00
Fraction with Carry > 20%	0.04	0.10	0.02	0.03	0.00	0.00
GP Commitment:						
Mean GP Commitment (%)	2.44	1.62	2.43	6.59	3.53	0.90
Median GP Commitment (%)	1.00	1.00	1.00	1.52	1.00	0.99
St. Dev. GP Commitment (%)	6.18	2.61	6.47	11.91	8.16	1.22
Fraction with GP % $\in$ 0.99% - 1.01%	0.43	0.57	0.37	0.23	0.43	0.44
Fraction with GP % < 0.99%	0.22	0.18	0.23	0.14	0.32	0.44
Fraction with GP % > 1.01%	0.36	0.24	0.40	0.63	0.25	0.11

Table 4: Fund Size and Market Conditions

This table presents cross-sectional fund-level OLS estimates of the relation between fund size and market conditions at the time the fund was raised. The dependent variable is the natural logarithm of fund size (in $M). Industry Flows is total capital committed to all funds of the same type raised in the fund's vintage year (data from Venture Economics). Adjusted Industry Flows is Industry Flows divided by total U.S. stock market capitalization at the end of the vintage year (data from CRSP). "VC boom", "Buyout boom", and "Real Estate boom" are indicator variables for whether the fund was raised during 1997-2001, 2005-2008, or 2004-2008, respectively, the respective boom periods in fundraising activity reported by Venture Economics. Standard errors (in parentheses) are robust to heteroskedasticity and clustered by vintage year. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Dependent Variable = ln(Fund Size)		
	(1)	(2)	(3)
ln (Industry Flows)	0.257***		
	(0.040)		
ln (Adjusted Industry Flows)		0.376***	
		(0.061)	
VC boom × VC Fund Indicator			0.852***
			(0.200)
Buyout boom × Buyout Fund Indicator			2.093***
			(0.173)
Real Estate boom × RE Fund Indicator			0.839***
			(0.231)
Buyout Fund Indicator	1.022***	1.012***	1.503**
	(0.108)	(0.101)	(0.124)
Real Estate Fund Indicator	2.068***	2.412***	1.986***
	(0.162)	(0.179)	(0.135)
Debt Fund Indicator	0.868***	1.246***	
	(0.186)	(0.205)	
Fund-of-Funds Indicator	0.659***	0.893***	
	(0.197)	(0.207)	
	2.183***	7.062***	4.172***
	(0.380)	(0.425)	(0.100)
Sample	All	All	VC, BO, RE
Observations	975	975	910
R-squared	0.238	0.238	0.246

Table 5: The Performance of Private Equity Funds: Cash Flow Based

We calculate IRRs and public market equivalents (PMEs) using actual fund cash flows. PMEs are calculated relative to the S&P 500. The table reports cross-sectional statistics of fund-level final realized performance. The table includes only the sample of liquidated funds (those with vintage years prior to 2006 that were liquidated as of 6/30/2010; see Table 2).

	All	VC & BO	VC	BO	RE	Debt	FoF
IRR (Equally weighted):							
Mean	0.11	0.11	0.09	0.12	0.12	0.06	0.22
Median	0.08	0.07	0.02	0.10	0.11	0.05	0.25
Std. Deviation	0.35	0.36	0.47	0.28	0.12	0.45	0.15
25^{th} Percentile	-0.02	-0.03	-0.08	-0.01	0.05	-0.01	0.14
75^{th} Percentile	0.20	0.20	0.16	0.22	0.18	0.13	0.32
PME (Equally weighted):							
Mean	1.15	1.14	1.03	1.20	1.21	1.10	1.23
Median	1.02	1.01	0.81	1.10	1.22	1.01	1.07
Std. Deviation	0.78	0.81	0.95	0.71	0.41	0.68	0.43
25^{th} Percentile	0.72	0.69	0.52	0.81	0.93	0.69	1.02
75^{th} Percentile	1.43	1.42	1.13	1.46	1.55	1.21	1.45
IRR (Size-weighted):							
Mean	0.09	0.09	-0.07	0.12	0.12	0.06	0.24
Median	0.11	0.11	-0.03	0.13	0.10	0.12	0.25
Std. Deviation	0.26	0.27	0.41	0.24	0.11	0.24	0.12
25^{th} Percentile	0.01	0.00	-0.11	0.04	0.05	0.01	0.17
75^{th} Percentile	0.19	0.19	0.05	0.19	0.19	0.14	0.36
PME (Size-weighted):							
Mean	1.15	1.14	0.84	1.19	1.17	1.17	1.25
Median	1.07	1.05	0.75	1.12	1.20	1.20	1.07
Std. Deviation	0.48	0.49	0.66	0.45	0.37	0.48	0.37
25^{th} Percentile	0.86	0.85	0.51	0.90	0.93	0.86	1.03
75^{th} Percentile	1.44	1.44	0.94	1.46	1.39	1.53	1.53
N	632	560	192	368	35	28	9

Table 6: Performance by Vintage Year

This table reports size-weighted average final fund performance, measured both by IRRs and PMEs, by vintage year for each type of fund in our sample, for all funds combined, and for VC and buyout funds combined. PMEs are measured with respect to the S&P 500. The table includes only the sample of liquidated funds (those with vintage years prior to 2006 that were liquidated as of 6/30/2010; see Table 2).

	All			VC & BO			Venture			Buyout			Real Estate			Debt			FoF		
Vintage	N	IRR	PME	N	IRR	PME	N	IRR	PME	N	IRR	PME	N	IRR	PME	N	IRR	PME	N	IRR	PME
1984	9	0.20	1.06	9	0.20	1.06	6	0.10	0.78	3	0.38	1.56	-	-	-	-	-	-	-	-	-
1985	10	0.21	1.18	10	0.21	1.18	5	0.12	0.92	5	0.24	1.29	-	-	-	-	-	-	-	-	-
1986	4	0.03	0.87	4	0.03	0.87	3	-0.10	0.78	1	0.13	0.93	-	-	-	-	-	-	-	-	-
1987	15	0.19	1.24	15	0.19	1.24	6	0.06	0.73	9	0.20	1.30	-	-	-	-	-	-	-	-	-
1988	24	0.09	0.78	23	0.09	0.79	9	0.15	1.02	14	0.09	0.76	1	0.04	0.68	-	-	-	-	-	-
1989	25	0.20	1.15	25	0.20	1.15	10	0.18	1.17	15	0.20	1.15	-	-	-	-	-	-	-	-	-
1990	8	0.27	1.35	8	0.27	1.35	1	0.15	1.01	7	0.28	1.36	-	-	-	-	-	-	-	-	-
1991	2	0.16	0.82	2	0.16	0.82	-	-	-	2	0.16	0.82	-	-	-	-	-	-	-	-	-
1992	7	0.35	1.28	7	0.35	1.28	3	0.06	0.84	4	0.37	1.31	-	-	-	-	-	-	-	-	-
1993	12	0.42	1.44	11	0.42	1.43	5	0.36	1.19	6	0.44	1.50	-	-	-	-	-	-	1	0.36	1.53
1994	33	0.28	1.26	28	0.29	1.31	6	0.52	1.87	22	0.28	1.29	3	0.24	1.02	-	-	-	2	0.18	1.02
1995	41	0.17	1.29	35	0.18	1.32	11	0.21	1.22	24	0.18	1.33	1	0.16	0.96	4	-0.09	0.64	1	0.25	1.07
1996	54	0.10	1.09	42	0.09	1.08	6	0.27	1.26	36	0.09	1.08	6	0.11	1.11	3	0.04	0.87	3	0.28	1.16
1997	57	0.16	1.46	46	0.16	1.46	16	0.42	1.80	30	0.13	1.43	6	0.12	1.46	5	0.14	1.42	-	-	-
1998	91	0.07	1.27	80	0.07	1.28	26	0.30	1.53	54	0.06	1.27	4	0.05	1.20	6	0.00	0.91	1	0.14	2.15
1999	77	-0.09	1.07	67	-0.10	1.05	30	-0.27	0.61	37	-0.03	1.22	4	0.06	1.26	6	0.02	1.38	-	-	-
2000	97	0.03	1.08	94	0.03	1.07	34	-0.11	0.71	60	0.06	1.14	2	0.08	1.39	1	0.13	1.11	-	-	-
2001	37	0.01	0.99	30	0.00	0.98	8	-0.22	0.64	22	0.04	1.03	3	0.18	1.37	3	0.07	1.07	1	-0.01	0.80
2002	14	0.23	1.20	12	0.24	1.20	6	0.03	0.85	6	0.27	1.25	2	0.14	1.11	-	-	-	-	-	-
2003	10	0.45	1.33	7	0.50	1.43	-	-	-	7	0.50	1.43	3	0.22	0.74	-	-	-	-	-	-
2004	2	0.17	1.04	2	0.17	1.04	-	-	-	2	0.17	1.04	-	-	-	-	-	-	-	-	-
2005	3	0.14	1.03	3	0.14	1.03	1	-0.06	0.80	2	0.14	1.04	-	-	-	-	-	-	-	-	-

Table 7: The Determinants of General Partner Compensation

This table presents cross-sectional fund-level OLS estimates of the relations between general partner compensation measures and other fund characteristics. In Panel A, the dependent variable is the percentage of carried interest, defined in Table 1. Because fund types other than VC and Buyout exhibit virtually no variation in Carried Interest, only VC and Buyout funds are included in Panel A. In Panel B, the dependent variable is the Initial Management Fee (expressed in percent per year), also defined in Table 1, and the sample includes all fund types. Since many contracts stipulate management fees that vary over the life of the fund as the fund ages or draws down capital, we use the initial management fee. ln(Fund No.) is the natural logarithm of the fund's sequence number (its position in a partnership's sequence of funds). All other variables are defined in previous tables. Vintage year fixed effects are included in Column (4) of each panel. A constant is estimated in each specification but suppressed for brevity. Standard errors (in parentheses) are robust to heteroskedasticity and clustered at the partnership level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Panel A: Carried Interest (%)					
	(1)	(2)	(3)	(4)	(5)	(6)
VC Boom	0.426**	-0.035				
	(0.205)	(0.181)				
Buyout Boom				-0.791	-1.005*	
				(0.544)	(0.539)	
ln(Fund Size)		0.373***	0.325***		0.139**	0.126*
		(0.119)	(0.120)		(0.071)	(0.076)
ln(Fund No.)		0.579***	0.623***		-0.160	-0.184
		(0.204)	(0.218)		(0.151)	(0.157)
Sample	VC	VC	VC	BO	BO	BO
Vintage Year FE?	No	No	Yes	No	No	Yes
Observations	295	294	294	542	541	541
R-squared	0.014	0.173	0.196	0.020	0.035	0.078

	Panel B: Initial Management Fee (% per year)				
	(1)	(2)	(3)	(4)	(5)
VC boom × VC Fund	0.030	0.116**	0.112**		
	(0.053)	(0.053)	(0.053)		
Buyout Boom × Buyout Fund	-0.108**	0.103**	0.099**		
	(0.049)	(0.050)	(0.049)		
Real Estate Boom × RE Fund	0.191	0.268**	0.265**		
	(0.116)	(0.110)	(0.106)		
ln(Fund Size)		-0.102***	-0.094***	-0.116***	-0.113***
		(0.016)	(0.017)	(0.017)	(0.016)
ln(Fund No.)			-0.027	-0.040	-0.024
			(0.034)	(0.033)	(0.032)
Buyout Indicator	-0.434***	-0.279***	-0.293***	-0.343***	-0.341***
	(0.058)	(0.063)	(0.065)	(0.047)	(0.047)
Real Estate Indicator	-0.910***	-0.707***	-0.719***	-0.771***	-0.771***
	(0.126)	(0.120)	(0.122)	(0.106)	(0.107)
Debt Indicator					-0.695***
					(0.088)
Fund-of-funds Indicator					-1.080***
					(0.102)
Sample		VC, Buyout, Real Estate			All
Vintage Year FE?	No	No	No	Yes	Yes
Observations	815	815	814	814	878
R-squared	0.280	0.337	0.338	0.398	0.416

Table 8: Determinants of General Partner Capital Commitments

This table presents cross-sectional fund-level estimates of the relations between general partner capital commitments and other fund characteristics. GP Bin is 0 if the GP capital commitment is below 0.99% of total fund size, 1 if it is between 0.99% and 1.01%, and 2 if it exceeds 1.01%. GP High is a dummy variable equal to 1 if the GP capital commitment exceeds 1.01% and 0 otherwise. ln(GP%) is the log of GP capital commitment if the GP capital commitment is greater than 1.01%. All other variables are defined in previous tables. Even-numbered columns include vintage year fixed effects. Standard errors (in parentheses) are robust to heteroskedasticity and clustered at the partnership level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	DV = GP Bin Ordered Probit		DV = GP High Probit		DV = ln(GP%) OLS	
	(1)	(2)	(3)	(4)	(5)	(6)
VC boom × VC fund	-0.153		-0.117		0.003	
	(0.119)		(0.165)		(0.200)	
Buyout boom × Buyout fund	0.652**		0.799***		0.112	
	(0.286)		(0.249)		(0.098)	
Real estate boom × RE fund	-1.024*		-0.931*		-0.062	
	(0.559)		(0.473)		(0.128)	
ln(Fund Size)	0.106**	0.103**	0.129***	0.108**	-0.077**	-0.010**
	(0.044)	(0.046)	(0.048)	(0.049)	(0.041)	(0.041)
ln(Fund No.)	-0.084	-0.088	-0.092	-0.135	-0.080	-0.033
	(0.073)	(0.073)	(0.083)	(0.083)	(0.068)	(0.069)
Buyout Indicator	-0.053	0.064	0.211	0.348**	0.155	0.152
	(0.133)	(0.108)	(0.181)	(0.144)	(0.190)	(0.103)
Real estate Indicator	0.206	0.159	0.559**	0.517**	0.524**	0.528***
	(0.231)	(0.216)	(0.242)	(0.209)	(0.218)	(0.153)
Debt Indicator		-0.090		0.118		0.549*
		(0.202)		(0.248)		(0.306)
Fund-of-funds Indicator		-0.461*		-0.552*		0.108
		(0.254)		(0.283)		(0.232)
Constant			-1.114***	-0.628	1.794***	2.093***
			(0.237)	(0.519)	(0.227)	(0.355)
Sample	VC,BO,RE	All	VC,BO,RE	All	VC,BO,RE	All
Vintage Year FE?	No	Yes	No	Yes	No	Yes
N	907	987	907	984	344	362
R-squared	0.018	0.025	0.052	0.068	0.069	0.134

Table 9: Fund Performance and Fund Characteristics

This table presents cross-sectional fund-level OLS estimates of the relations between final fund performance and fund size and the performance of the partnership's previous fund. The sample includes only liquidated funds. The dependent variable is the PME with respect to the S&P 500. All specifications include vintage year fixed effects. Standard errors (in parentheses) are robust to heteroskedasticity and clustered at the partnership level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Dependent Variable = PME								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
ln(Fund Size)	-0.004	0.225*		0.046	0.824**		0.013	0.262*	
	(0.028)	(0.123)		(0.054)	(0.324)		(0.034)	(0.146)	
ln(Fund Size)^2		-0.022**			-0.089***			-0.022*	
		(0.010)			(0.031)			(0.012)	
ln(Fund No.)		0.036			0.177			-0.015	
		(0.055)			(0.120)			(0.073)	
Previous fund PME			0.265***			0.165			0.224***
			(0.063)			(0.101)			(0.062)
Buyout Indicator	0.176*	0.189*	-0.049						
	(0.100)	(0.098)	(0.159)						
RE Indicator	0.152	0.150	-0.122						
	(0.111)	(0.109)	(0.212)						
Debt Indicator	0.005	0.009	0.008						
	(0.157)	(0.159)	(0.311)						
FoF Indicator	0.191	0.199	-0.231						
	(0.151)	(0.151)	(0.347)						
Constant	0.817***	0.353	0.704***	0.525*	-1.218	0.630***	0.856***	0.356	0.716***
	(0.200)	(0.392)	(0.144)	(0.316)	(0.837)	(0.126)	(0.283)	(0.470)	(0.090)
Sample	All	All	All	VC	VC	VC	BO	BO	BO
Vintage Year FE?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	632	630	244	192	191	73	368	367	152
R-squared	0.057	0.061	0.170	0.168	0.189	0.357	0.057	0.062	0.169

Table 10: Fund Performance and Fund Terms

This table presents cross-sectional fund-level OLS estimates of the relations between final fund performance and the terms of the fund management contract. In all specifications, the dependent variable is the fund's final PME with respect to the S&P 500. The initial management fee is expressed in percent per year. "Carry High" and "Carry Low" are indicator variables for whether carried interest is greater than or less than 20%, respectively, and "GP % High" and "GP % Low" are indicator variables for whether the GP commitment is greater than 1.01% of fund size or less than 0.99% of fund size, respectively. All other variables are defined in previous tables. The table uses only the sample of liquidated funds. All specifications include vintage year fixed effects. Standard errors (in parentheses) are robust to heteroskedasticity and clustered at the partnership level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Dependent Variable = PME						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Initial mgmt. fee	-0.043					0.017	0.001
	(0.079)					(0.084)	(0.080)
Carried interest (%)		0.005				0.005	0.006
		(0.020)				(0.022)	(0.022)
Carry High			-0.176				
			(0.130)				
Carry Low			-0.506***				
			(0.166)				
GP Commitment (%)				0.002			
				(0.004)			
GP % High					0.022	0.026	0.034
					(0.062)	(0.061)	(0.061)
GP % Low					0.155*	0.170*	0.175*
					(0.083)	(0.090)	(0.090)
ln(Fund Size)							0.202
							(0.129)
ln(Fund Size)^2							-0.020*
							(0.011)
Buyout dummy	0.078	0.175*	0.156	0.172*	0.161*	0.169	0.174
	(0.120)	(0.098)	(0.101)	(0.095)	(0.094)	(0.103)	(0.108)
Real estate dummy	0.028	0.149	0.125	0.137	0.146	0.184	0.166
	(0.135)	(0.112)	(0.117)	(0.114)	(0.111)	(0.128)	(0.132)
Debt dummy	-0.119	0.006	-0.021	-0.000	-0.020	-0.014	-0.039
	(0.184)	(0.159)	(0.162)	(0.158)	(0.161)	(0.164)	(0.167)
Fund-of-funds dummy	-0.089	0.193	0.163	0.193	0.150	0.215	0.201
	(0.172)	(0.151)	(0.155)	(0.150)	(0.146)	(0.160)	(0.158)
Constant	0.942***	0.691	0.804***	0.787***	0.778***	0.632	0.281
	(0.204)	(0.431)	(0.077)	(0.074)	(0.095)	(0.497)	(0.611)
Vintage Year FE?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	547	632	632	632	632	632	632
R-squared	0.061	0.057	0.064	0.057	0.063	0.068	0.071

Table 11: Fund Performance and Market Conditions

This table presents fund-level OLS estimates of the relations between final fund performance and market conditions at time of fundraising. In the first four columns, the variable Flows is equal to the natural logarithm of Industry Flows, the total capital committed to all funds of the same type raised in the fund's vintage year (data from Venture Economics). In the next four columns, the variable Flows is equal to Adjusted Industry Flows, which is Industry Flows expressed as a percentage of total U.S. stock market capitalization at the end of the vintage year (data from CRSP).Size Q1-3 are indicator variables for whether the fund's size falls into the bottom, second, or top tercile of the size distribution of all funds of the same type. Panel A reports results for all funds, Panel B for VC funds, and Panel C for Buyout funds. In all specifications, a constant is estimated but not reported for brevity. In Panel A, fund type indicator variables are estimated but not reported. In columns (4), (5), (7), and (8) Size Q indicator variables are estimated but not reported. All specifications use only the sample of liquidated funds. In odd-numbered columns, the dependent variable is fund IRR. In even-numbered columns, the dependent variable is fund PME with respect to the S&P 500. Standard errors (in parentheses) are robust to heteroskedasticity and clustered by vintage year. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A: All Funds

	Flows = ln(Industry Flows)				Flows = Adjusted Industry Flows			
	IRR	PME	IRR	PME	IRR	PME	IRR	PME
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Flows	-0.030***	0.018			-0.320***	-0.104		
	(0.010)	(0.020)			(0.066)	(0.175)		
Flows×Size Q1			-0.019	0.063**			-0.176*	0.471
			(0.012)	(0.026)			(0.101)	(0.322)
Flows×Size Q2			-0.021	0.022			-0.327***	-0.045
			(0.013)	(0.021)			(0.085)	(0.213)
Flows×Size Q3			-0.057***	-0.045*			-0.392***	-0.485**
			(0.015)	(0.026)			(0.121)	(0.201)
Observations	621	621	621	621	621	621	621	621
R-squared	0.037	0.017	0.051	0.034	0.047	0.017	0.056	0.032

Panel B: VC Funds

	Flows = ln(Industry Flows)				Flows = Adjusted Industry Flows			
	IRR	PME	IRR	PME	IRR	PME	IRR	PME
Flows	-0.037**	-0.017			-0.432***	-0.535***		
	(0.017)	(0.039)			(0.114)	(0.162)		
Flows×Size Q1			-0.011	0.051			-0.210*	-0.058
			(0.018)	(0.044)			(0.114)	(0.360)
Flows×Size Q2			-0.016	0.016			-0.458***	-0.485*
			(0.029)	(0.056)			(0.117)	(0.275)
Flows×Size Q3			-0.117**	-0.206*			-0.411	-0.677
			(0.054)	(0.115)			(0.259)	(0.510)
Observations	191	191	191	191	191	191	191	191
R-squared	0.034	0.001	0.102	0.049	0.076	0.023	0.117	0.042

Panel C: Buyout Funds

	Flows = ln(Industry Flows)				Flows = Adjusted Industry Flows			
	IRR	PME	IRR	PME	IRR	PME	IRR	PME
Flows	-0.025***	0.036*			-0.202**	0.342		
	(0.009)	(0.018)			(0.074)	(0.201)		
Flows×Size Q1			-0.019	0.081**			-0.094	1.097***
			(0.016)	(0.036)			(0.154)	(0.307)
Flows×Size Q2			-0.026**	0.017			-0.287**	0.176
			(0.010)	(0.018)			(0.109)	(0.217)
Flows×Size Q3			-0.034*	-0.003			-0.218	-0.210
			(0.017)	(0.032)			(0.148)	(0.279)
Observations	368	368	368	368	368	368	368	368
R-squared	0.024	0.008	0.026	0.018	0.015	0.007	0.018	0.027

Table 12: Capital Calls and Macroeconomic Conditions

This table presents estimates of the relations between the probability of capital calls, and call amounts, and macroeconomic conditions. The unit of observation is a fund-calendar quarter. ln(P/D) is the natural logarithm of the price/dividend ratio of the S&P 500 at the end of the preceding calendar quarter. ln(TED) is the natural logarithm of the TED spread at the end of the preceding calendar quarter. % Uncalled is the percentage of committed capital that has not been called by the end of the previous calendar quarter. Crisis is a dummy for calendar quarters between 2007 Q3 and 2009 Q1 (inclusive). In Models (1)-(5), the dependent variable is a dummy variable equal to 1 if the fund calls capital in a given quarter and 0 otherwise. In Models (6)-(9), the dependent variable is the natural logarithm of one plus the amount of the capital call expressed as a percentage of committed capital. Models (1)-(5) are estimated by OLS. Models (6)-(9) are estimated by Tobit. The estimates include only observations where there is some uncalled capital remaining. All specifications include a constant and fixed effects for fund age (measured in quarters), vintage year, and (in Panel A) fund type (unreported). Models (1) also include calendar quarter fixed effects (unreported). Standard errors (in parentheses) are robust to heteroskedasticity and clustered by calendar quarter. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Sample includes all funds

	Models (1)-(5): DV = Capital Call Occurs					Models (6)-(9): DV = ln(1 + % Called)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
ln(P/D)		0.082***	0.089***		0.094***	0.365***	0.448***		0.439***
		(0.020)	(0.020)		(0.020)	(0.122)	(0.114)		(0.124)
ln(TED)		0.032***	0.033***		0.049***	0.219***	0.223***		0.289***
		(0.010)	(0.009)		(0.010)	(0.056)	(0.050)		(0.059)
ln(% Uncalled)			0.059***		0.065***		0.359***		0.376***
			(0.007)		(0.006)		(0.025)		(0.024)
Crisis Indicator				-0.023*	0.721***			-0.054	2.299***
				(0.014)	(0.150)			(0.068)	(0.772)
Crisis×ln(P/D)					-0.165***				-0.514**
					(0.041)				(0.201)
Crisis×ln(TED)					-0.030*				-0.122
					(0.015)				(0.081)
Crisis×ln(% Uncalled)					-0.066***				-0.262***
					(0.010)				(0.052)
Observations	25,410	25,379	25,379	25,410	25,379	25,379	25,379	25,410	25,379
R-squared	0.176	0.163	0.171	0.160	0.173	0.090	0.097	0.088	0.098

Panel B: Sample includes only VC funds

	Models (1)-(5): DV = Capital Call Occurs					Models (6)-(9): DV = ln(1 + % Called)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
ln(P/D)		0.121***	0.117***		0.114***	0.561**	0.684***		0.682***
		(0.036)	(0.035)		(0.037)	(0.261)	(0.237)		(0.255)
ln(TED)		0.064***	0.061***		0.079***	0.416***	0.388***		0.445***
		(0.016)	(0.014)		(0.019)	(0.099)	(0.089)		(0.111)
ln(% Uncalled)			0.085***		0.091***		0.508***		0.530***
			(0.010)		(0.010)		(0.048)		(0.050)
Crisis Indicator				0.006	0.406*			0.131	2.914*
				(0.017)	(0.215)			(0.125)	(1.592)
Crisis×ln(P/D)					-0.091				-0.659*
					(0.055)				(0.395)
Crisis×ln(TED)					-0.024				-0.087
					(0.024)				(0.145)
Crisis×ln(% Uncalled)					-0.066***				-0.312***
					(0.012)				(0.087)
Observations	7,345	7,328	7,328	7,345	7,328	7,328	7,328	7,345	7,328
R-squared	0.189	0.151	0.165	0.144	0.167	0.081	0.090	0.076	0.090

Panel C: Sample includes only Buyout funds

	Models (1)-(5): DV = Capital Call Occurs					Models (6)-(9): DV = ln(1 + % Called)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
ln(P/D)		0.096***	0.105***		0.115***	0.360***	0.426***		0.432***
		(0.020)	(0.019)		(0.018)	(0.114)	(0.108)		(0.119)
ln(TED)		0.011	0.013		0.025***	0.141***	0.153***		0.201***
		(0.008)	(0.008)		(0.009)	(0.049)	(0.044)		(0.053)
ln(% Uncalled)			0.059***		0.064***		0.327***		0.339***
			(0.007)		(0.007)		(0.025)		(0.024)
Crisis Indicator				-0.047***	0.995***			-0.126*	2.944***
				(0.017)	(0.118)			(0.072)	(0.624)
Crisis×ln(P/D)					-0.234***				-0.692***
					(0.034)				(0.158)
Crisis×ln(TED)					-0.020				-0.076
					(0.013)				(0.067)
Crisis×ln(% Uncalled)					-0.061***				-0.208***
					(0.012)				(0.058)
Observations	14,628	14,614	14,614	14,628	14,614	14,614	14,614	14,628	14,614
R-squared	0.184	0.172	0.180	0.170	0.182	0.097	0.104	0.096	0.105

Table 13: Distributions and Macroeconomic Conditions

This table presents estimates of the relations between the probability of distributions to LPs, and distribution amounts, and macroeconomic conditions. The unit of observation is a fund-calendar quarter. In Models (1)-(5), the dependent variable is a dummy variable equal to 1 if the fund distributes capital in a given quarter and 0 otherwise. In Models (6)-(9), the dependent variable is the natural logarithm of one plus the amount of the distribution expressed as a percentage of committed capital. Models (1)-(5) are estimated by OLS. Models (6)-(9) are estimated by Tobit. The estimates include only observations where some capital has been called previously. All specifications include a constant and fixed effects for fund age (measured in quarters), vintage year, and (in Panel A) fund type (unreported). Models (1) also include calendar quarter fixed effects (unreported). Standard errors (in parentheses) are robust to heteroskedasticity and clustered by calendar quarter. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Sample includes all funds

		Models (1)-(5): DV = Distribution Occurs				Models (6)-(9): DV = ln(1 + % Distributed)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
ln(P/D)		0.133***	0.131***		0.107***	1.097***	1.062***		0.848***
		(0.019)	(0.020)		(0.024)	(0.141)	(0.143)		(0.170)
ln(TED)		0.018*	0.018*		0.053***	0.156**	0.151**		0.398***
		(0.010)	(0.010)		(0.013)	(0.074)	(0.075)		(0.091)
ln(% Uncalled)			-0.007***		-0.007***		-0.093***		-0.101***
			(0.002)		(0.002)		(0.017)		(0.018)
Crisis Indicator				-0.068***	-0.529**			-0.457***	-4.508***
				(0.023)	(0.217)			(0.163)	(1.530)
Crisis×ln(P/D)					0.104*				0.915**
					(0.055)				(0.388)
Crisis×ln(TED)					-0.011				-0.179
					(0.020)				(0.140)
Crisis×ln(% Uncalled)					0.002				0.092***
					(0.005)				(0.026)
Observations	39,277	39,258	39,258	39,277	39,258	39,258	39,258	39,277	39,258
R-squared	0.113	0.093	0.094	0.090	0.097	0.044	0.044	0.040	0.047

Panel B: Sample includes only VC funds

		Models (1)-(5): DV = Distribution Occurs				Models (6)-(9): DV = ln(1 + % Distributed)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
ln(P/D)		0.198***	0.198***		0.183***	2.138***	2.127***		1.898***
		(0.027)	(0.027)		(0.022)	(0.296)	(0.294)		(0.247)
ln(TED)		0.032**	0.032**		0.065***	0.390***	0.388***		0.692***
		(0.013)	(0.013)		(0.015)	(0.135)	(0.134)		(0.157)
ln(% Uncalled)			-0.002		-0.003		-0.027		-0.042
			(0.004)		(0.004)		(0.041)		(0.041)
Crisis Indicator				-0.054***	0.066			-0.442**	-1.097
				(0.018)	(0.184)			(0.192)	(2.255)
Crisis×ln(P/D)					-0.047				-0.013
					(0.048)				(0.583)
Crisis×ln(TED)					-0.041**				-0.407*
					(0.020)				(0.221)
Crisis×ln(% Uncalled)					0.019				0.199*
					(0.012)				(0.118)
Observations	12,508	12,499	12,499	12,508	12,499	12,499	12,499	12,508	12,499
R-squared	0.094	0.054	0.054	0.040	0.057	0.039	0.039	0.028	0.041

Panel C: Sample includes only Buyout funds

		Models (1)-(5): DV = Distribution Occurs				Models (6)-(9): DV = ln(1 + % Distributed)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
ln(P/D)		0.049*	0.045*		0.017	0.591***	0.552***		0.331
		(0.025)	(0.026)		(0.037)	(0.156)	(0.161)		(0.231)
ln(TED)		0.021*	0.021		0.059***	0.135*	0.130		0.383***
		(0.013)	(0.013)		(0.019)	(0.082)	(0.083)		(0.117)
ln(% Uncalled)			-0.012***		-0.012***		-0.118***		-0.123***
			(0.003)		(0.003)		(0.019)		(0.019)
Crisis Indicator				-0.067***	-0.624**			-0.506***	-4.513**
				(0.025)	(0.277)			(0.153)	(1.783)
Crisis×ln(P/D)					0.124*				0.893**
					(0.068)				(0.439)
Crisis×ln(TED)					0.014				-0.060
					(0.030)				(0.184)
Crisis×ln(% Uncalled)					-0.008				0.058
					(0.007)				(0.048)
Observations	20,693	20,683	20,683	20,693	20,683	20,683	20,683	20,693	20,683
R-squared	0.081	0.055	0.056	0.056	0.060	0.033	0.034	0.032	0.037