Investing Outside the Box: Evidence from Alternative Vehicles in Private Equity

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This paper uses previously unexplored custodial data to examine the use of alternative investment vehicles in private equity over four decades. We document a steep increase in the capital directed to alternative vehicles, with these vehicles approaching a 40% share of all PE commitments in 2017. The average performance of alternative vehicles matches that of the overall PE market, but the performance lagged that of the general partners' corresponding main funds. The best performance in alternative vehicles was by endowments, private pensions, and insurers. Finally, LPs with better past performance invested in alternative vehicles with better performance, even after conditioning on the general partners' past records. The results suggest that returns in private equity increasingly depend on the match between GPs and LPs and both parties' outside options.

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Introduction

The last two decades have seen a significant transformation of the structure of the private equity (PE) industry. Not only has the amount of capital under management by buyout, venture, and private debt funds grown dramatically, but it has become more concentrated in a smaller set of fund families. At the same time, general partners (GPs) have increasingly offered alternatives to their traditional monolithic large funds, such as co-investment vehicles, parallel funds, feeder funds, and more. This greater diversity of fund structures might allow for better customization of products to meet the preferences of each limited partner (LP). But these changes also give GPs the opportunity for more differentiation of fees and access by investor types. For example, case studies and practitioner accounts suggest that certain large high-profile investors receive more co-investment opportunities and chances to access investments in other favored ways.[2]

It has been difficult to systematically analyze the extent and implications of these industry changes, however, due to the lack of systematic data about the new vehicles. In this paper, we document for the first time several stylized facts about the growth of alternative vehicles over the last four decades. In a second step, we revisit some of the enduring puzzles of private equity. Earlier research has shown that in the 1980s and 1990s, some funds persistently produced positive alphas for their investors, yet did not sharply increase their capital under management despite being highly oversubscribed (e.g., Kaplan and Schoar, 2005; Brown et al, 2015). Compensation has been shown to be bunched, with annual management fees falling between 1.5% and 2% of committed capital and carried interest (profit share) of around 20% (Gompers and Lerner, 1999; Metrick and

[2] See, for instance, the discussion of the investment strategies of the Canadian Pension Plan Investment Board and the Teachers Retirement System of Texas in Lerner, Rhodes-Kropf, and Burbank (2013) and Rhodes-Kropf et al. (2014).

Yasuda, 2010). This behavior seemingly runs counter to a neoclassical investment model, where managers with scarce human capital appropriate the residual rents from their funds either by charging higher fees or growing their assets under management, as depicted in Berk and Green (2004). We provide evidence to resolve this puzzle and suggest that the new vehicles allow private equity groups to differentiate between investors and vary the returns to an investor based on the quality and outside opportunities of the LP.

We use a data set covering all investment vehicles organized by private equity funds—whether groups specializing in buyouts (including growth capital), venture, or private debt—invested in by 108 asset owners with PE holdings and for whom State Street Corporation acts as a custodian. The data capture all cash flows between the LPs and the PE managers in their portfolios. In total, the data set includes over one half-trillion dollars of commitments in twenty thousand investments by LPs between 1980 and mid-2017.

We first document a set of new stylized facts concerning the evolution of alternative investment vehicles in private equity during our sample period:

- *Vehicle Types*: PE investments can be broadly categorized into main funds, discretionary vehicles, and GP-directed vehicles. The former are the traditional funds that have been the focus of prior academic research; the latter two are what we term alternative vehicles. Discretionary vehicles include co-investment opportunities that are provided by a GP but in which the LP maintains discretion over which deals to invest. GP-directed vehicles typically are funds that invest in similar securities as the main funds, where the GP retains

key decision-making powers. Of the roughly 5500 distinct vehicles attracting investments, 32% by number and 17% by capital commitments were alternative vehicles.

- *Capital allocation:* The allocation of private equity outside of traditional funds has been growing over time. In the 1980s, less than 10% of capital commitments to private equity were to alternative vehicles. By 2017, this share increased to almost 40%. This trend has been particularly driven by the buyout industry, where alternative vehicles comprise about 38% of all vehicles raised. (In VC, alternative vehicles comprise only 20% of all entities raised.) In addition, the use of alternative vehicles is widespread among investors. For instance, of the 108 investors in PE in our sample, 87 invested in GP-directed and 69 in discretionary vehicles.
- *Performance*: In the cross section, the average performance of alternative vehicles is very similar to that of the average main fund in our sample. However, alternative vehicles underperform relative to the main funds raised by the same partnership in the same year (or in the years immediately prior). Using weighted average Public Market Equivalent (PME) performance, discretionary vehicles underperform by 0.016 and GP-directed vehicles underperform by 0.101, with only the latter being statistically significant.

We then analyze what drives this underperformance of alternative vehicles relative to their main funds. We formulate two competing hypotheses that might shape our view of such "outside the box" investments. The first is heterogeneity in sophistication and information asymmetry by LPs. GPs may have superior information to LPs, and exploit their favorable position by offering inferior investment opportunities to the LPs. More sophisticated LPs would turn them down, but some LPs may accept these opportunities since they are not able to understand that they are being

offered inferior vehicles. Alternatively, one might worry that some LPs accept these lower quality deals, since they are trying to maximize their personal "career concerns"—the prospect that direct investment success may lead to a more lucrative position with a general partnership. Key in this story is the idea that heterogeneity in performance across LPs reflects differences in LP quality or objectives, but not differences in the offers they receive from the GPs.

The second hypothesis relies on the idea that both GPs and LPs have pricing power. In a Berk-Green world, we would anticipate that more established GPs would be more likely to capitalize on their reputation and raise larger funds and offer differentiated products to maximize their fee income. Groups with excess LP demand might set up alternative vehicles to allow less premier LPs to invest with them. But to observe heterogeneous returns between different investment vehicles, there must be differences in LP pricing power. Some asset owners are likely to be more attractive to GPs if they have abundant financial resources, which translates into larger capital commitments (as examples in footnote 2 above suggest), greater connections and value added, or an ability to provide GPs with "liquidity insurance" in bad times (Lerner and Schoar, 2004). LPs with greater attractiveness may have more bargaining power, and may be offered attractive alternative vehicles. This view is consistent, for example, with Pastor, Stambaugh, and Taylor (2015) and Gerakos, Linnainmaa, and Morse (2016). Key in this story is that top GPs offer lower return vehicles to worse LPs, but the performance of these vehicles still beats or matches the performance of the other investments these lower-level LPs could have invested in.

We provide evidence consistent with the second hypothesis—alternative vehicles can be seen as the result of a bargaining process between a set of heterogeneous GPs and LPs in the private

equity market. We find that partnerships with higher past PMEs are able to raise more capital in both their main funds and side vehicles relative to GPs with lower PMEs. The average performance of alternative vehicles offered by high-PME partnerships outperformed that of the average fund in the market. In contrast, alternative vehicles offered by low-PME partnerships performed more poorly. But when looking at the relative performance of the different types of alternative vehicles benchmarked against the main funds of these GPs, we see that GP-directed vehicles significantly underperform their main fund, especially for top performing GPs, while discretionary vehicles outperform even the main fund. If we believe that discretionary vehicles are typically offered only to the best LPs, the results support the idea that GPs differentiate the returns they offer to different types of investors.

In further support of this interpretation, we also find that LPs with better past performance invest in alternative vehicles that had above-average market performance: indeed, these side vehicles even outperform the main fund of the GP sponsoring them. In addition, the categories of LPs that have the highest performance in their alternative vehicle investments are those that are typically seen as high-prestige LPs, such as endowments and foundations, private pension funds, and insurance companies. The poorest performance in alternative vehicles is seen for fund-of-funds. We also find that larger LPs and North American LPs are less likely to resort to alternative vehicles, while European LPs are more likely to invest in these vehicles, even controlling for other LP characteristics. This again might suggest that LPs whose access to the top funds is more limited—i.e., those whose bargaining power is lower—are more likely to invest in alternative vehicles.

Finally, we show that there is an interaction between the past performance of LPs and GPs. We classify GPs and LPs by the average performance of their portfolios across all PE investments and test how the performance of the alternative vehicles varies with the quality of the match between LP and GP, e.g., a top-performing LP investing in a top-performing GP, and so on. The results show that alternative vehicles have the highest performance on average if the LPs and GPs involved in the vehicle are both above-median performers. This result is almost twice as large for investments in discretionary vehicles of top LPs into top GPs, compared to GP-directed vehicles. Since discretionary vehicles require more active involvement of the LPs, it might suggest that the human capital of LPs plays a role in their superior performance. In contrast, vehicles where both LP and GP are below-median performers have among the worst performance. And the off-diagonal matches (above-median LP and below-median GP, and *vice versa*) perform at intermediate levels. These results support the idea that GPs tailor the alternative vehicles they offer their LPs to the outside options of the LP. We rule out that this heterogeneity or match-specific performance is driven solely by the inability of some LPs to understand the investment opportunities: we confirm that the investments that lower-performance LPs make in top GPs still outperform the rest of these LPs' portfolios in PE. It appears LPs realistically assess the relative performance between different opportunities presented to them. In addition, we show that the match-specific differences in performance are not explained by some LPs and GPs having prior relationships that could reduce information asymmetries. Instead, we find that the results are unchanged even when controlling for any prior investment relationships between LPs and GPs.

Our paper adds to the existing literature by bringing together a number of prior findings. Fang, Ivashina, and Lerner (2015) analyzed co-investments and solo investments using

information from seven large limited partners, and showed that the net returns from these investments are little different than those from contemporaneous funds. Because the "haircuts" associated with fees and carry are much lower than direct transactions, these findings suggest that there might be adverse selection in the transactions offered to these partners. Our results suggest that this finding depends on the quality of the LPs making the co-investments. Braun, Jenkinson, and Schemmerl (2017) looked at co-investments recorded in the CapitalIQ database and found no evidence of difference in gross returns, a pattern that holds across virtually all classes of investor.

The rest of this paper is structured as follows. Section 2 describes the creation of the data set. Section 3 presents the usage of and analyzes the performance of alternative vehicles in general. Section 4 presents analyses across different classes of general partners and limited partners. The final section concludes the paper.

2. **Constructing the Sample**

A. State Street

The data in this paper consist of cash flows from the records of State Street Corporation's custodial unit, which provides services for asset owners, including pensions, sovereign wealth funds, and endowments. As of mid-2018, State Street's custody business was the world's largest, with over $30 trillion dollars in assets.[3] State Street also provides custodial services to fund managers and other clients, as well as engaging in asset management, securities trading, and

[3] Joe Parsons, "State Street leapfrogs BNY Mellon as world's largest custodian," *Global Custodian*, July 20, 2018, https://www.globalcustodian.com/state-street-leapfrogs-bny-mellon-worlds-largest-custodian/.

securities finance. State Street's PE index covers around three thousand funds over a thirty-year period and is used by some of the world's largest investors to benchmark their portfolios.

Among the custodial services that State Street (and other custodial banks) provide to their asset owner clients are keeping track of the securities held, monitoring cash flows between the investors and fund managers, executing the sales of securities and other transactions, assisting with foreign currency conversions, and documenting the investors' activities, including for tax purposes. (For an industry overview, see Clearing House, 2016.) Thus, in their role as a custodian, State Street has a comprehensive picture of the investments made by the asset owners that they work for. All cash flows are recorded net of management fees and carried interest charged by the general partners.

B. The Data Set

State Street's custodial division has a rich array of data on its clients. We use information on 108 large asset owners with PE exposure, which collectively had made over seventy thousand investments into private financial vehicles of various types, including private equity, real estate, hedge funds, securitizations, and many other assets. For the purposes of this paper, we focus exclusively on PE, including buyout and growth capital, private debt, and venture capital.

Identifying and classifying the vehicles associated with these PE groups may sound straightforward, but is actually challenging. For example, TPG Global Advisors' July 2017 filing of Form ADV with the U.S. Securities and Exchange Commission identified in Section 7B nearly

100 affiliated entities.[4] While some of these were clearly identifiable from their titles (e.g., TPG Parallel III), many had far less obvious names (e.g., Arrow Ridge Capital Master Fund, FoF Partners III-B, and MLS (B&C) AIV 1-B).

Moreover, there is not a clear mapping between the titles of these instruments and their characteristics. Labels like special purpose vehicle (SPV) and affiliated investment vehicle (AIV) are used by GPs in a seemingly random fashion. Thus, classifications could not be done on the basis of fund name, but required manual review. To illustrate the difficulty, AIVs frequently fell into two categories. The first type, often referred to as a "subsidiary AIV," was owned directly by the fund (either in whole or in part with other LPs). Subsidiary AIVs typically held a set of investments that mirrored the fund with which it is paired. The second kind of AIV, usually called a "side AIV," was not owned by the fund, but rather by a subset of the fund's partners, including the GP. This type of AIV typically co-invested in selected portfolio companies (or a portfolio company) alongside the fund.

Using State Street's internal classification scheme for investment vehicles in its State Street Global Exchange (GX) Private Equity Index (PEI) database, we identify twenty-two thousand of the seventy thousand transactions that appear to be private equity-related. Thus, we exclude many investments made by asset owners into vehicles organized by hedge and real estate groups without private equity funds.

[4] TPG Global Advisors, "Form ADV: Uniform Application for Investment Adviser Registration and Report by Exempt Reporting Advisers," July 19, 2017, https://adviserinfo.sec.gov/IAPD/content/ViewForm/crd_iapd_stream_pdf.aspx?ORG_PK=159732.

Using State Street's "standardized name convention" process, we identified 6,068 unique investment vehicles with associated LP and GP names. (In many cases, multiple LPs in the database invested in the same vehicle.) We also included in this total a number of vehicles that did not have a GP affiliation due to the nature of vehicle, especially what Fang, Ivashina and Lerner (2015) termed "solo" investments by LPs. We then filtered out 746 of these vehicles, including real estate funds, hedge funds, traditional funds-of-funds and secondary funds, and other non-PE vehicles (which are not the focus of this research paper).

We examine the remaining 5,322 vehicles. We associated them with general partners and classified them into three main categories, based on various sources. The key resources we used were:

- The GXPEI database, which contained data on the characteristics of the vehicles and links between the vehicles and PE groups. Even when the identifier field was blank, often a text note or other field indicated which PE group and/or fund the vehicle was associated with and its features.
- A list of vehicles associated with all private equity groups that we assembled from outside sources. We used the list to identify the unmatched vehicles listed in the database, as well as to determine their characteristics. The sources used to create the list included:
    - SEC Exhibit 21s for publicly traded entities, which lists the names of affiliate and subsidiary entities. As SEC regulations note: "A list of subsidiaries must be

disclosed to the SEC as Exhibit 21 to registration statements filed on Forms S-1, S-4, S-11, F-1, F-4, 10, and the annual report filed on Form 10-K."[5]

- All Form ADVs filed between 2001 and 2016. Since the passage of the Dodd-Frank Act, these forms must be filled out by all non-venture private equity with more than $150 million in assets under management in the United States. Section 7B of Form ADV includes the names of all affiliated entities.
- Searches of the SEC EDGAR database for keywords, "Affiliated Fund," "Co-invest," "Special Purpose Vehicle," "Special Investment Vehicle," "SPV," and "AIV." These searches generated a wide variety of documents filed by private equity groups listing affiliate structures, such as Form 400-APP/A, "Applications under the Investment Company Act other than those reviewed by Office of Insurance Products" and Form D.
- We finally undertook extensive research on the remaining unmatched entities to understand their properties and affiliations. The resources we used included fund web sites, media accounts, and the records in Preqin and Thomson Reuters (which sometime list a variety of alternative vehicles in addition to main funds).

Among the 5,322 investments, we were able to identify 3,620 "main funds." The majority of those in the database are contained in the State Street Global Exchange Index. Most main funds have a traditional eight- to ten-year horizon, but a few have less common structures, such as the long-duration funds that a number of private equity groups have raised in recent years.

[5] U.S. Securities and Exchange Commission, Office of Investor Advocacy and Education, "Researching Public Companies through EDGAR: A Guide for Investors," no date, https://www.sec.gov/oiea/Article/edgarguide.html.

Of the remaining entities, they were split between what we term 819 GP-directed vehicles and 883 discretionary vehicles. The underlying principle for our classification is whether the LPs had any input or control over the selection of the underlying investments or if the investment decision stayed entirely in the hands of the GPs. We define these as follows:

- GP-directed parallel vehicles (henceforth GP-directed) typically invest in similar securities as the main funds and the GP retains key decision-making powers. These vehicles contain special features to cater to certain classes of limited partners. For instance, they may be tailored to:
    - have more favorable economics for a limited partner that is making a sizeable capital commitment,
    - avoid domestic tax obligations for non-domestic investors, such as blocker funds and offshore vehicles,
    - allow the GP to continue to finance firms when they are running out of capital in the main fund,
    - not use capital call lines to address investors' concerns about risk, or
    - address many other limited partner concerns.
- Discretionary vehicles allow the limited partner to invest in one or more transactions that a general partner may offer them. Under this category, we include a number of vehicles. These include co-investments into individual companies by one or more LPs; solo investments by LPs in previously PE-financed companies; pledge fund structures where transactions are funded by the LP on a deal-by-deal basis (sometimes raised by groups that have encountered poor performance who have found raising a traditional fund difficult);

co-investment or overage funds that are raised alongside a main fund; and co-sponsored transactions between LPs and GPs. We also include co-investment funds raised by funds-of-funds and other intermediaries (though not the traditional funds-of-funds or secondary funds that they raise).[6] Many intermediaries have aggressively expanded into this area, especially after the widespread disillusionment with traditional funds-of-funds engendered by the Global Financial Crisis and the collapse of Bernard Madoff's hedge funds.

A natural question is the extent to which the State Street clients are representative of the industry. For instance, State Street could have gained or lost customers for its custodial business that might have led to dramatic fluctuations in the comprehensiveness of coverage over time. One way to evaluate this concern is to examine the commitments to main funds in the sample. We compute the ratio of these capital commitments over time to total capital commitments to PE funds. To estimate the overall commitments, we use the total global PE fundraising as estimated by Preqin from 1995 onward (2017 and earlier years). For the years before 1995, we use estimates from a variety of sources, including annual compilations in *Buyouts*, the *Private Equity Analyst*, and the *Venture Capital Journal* for the U.S., the various *Yearbooks* of the European Venture Capital Association for Europe, the *Asian Venture Capital Journal* for Asia, various publications and reports of the Latin American Venture Capital Association, and the reports of McDonald & Associates for Canada. Not all these sources go back to 1980; when they do not, we supplement the data series with estimates based on news stories, case studies, and trade journals.

[6] These co-investment funds run by funds-of-funds and other intermediaries may not allow that underlying asset owner to opt into individual investments. Thus, while the intermediary has discretion where to invest, the underlying LP may not.

This analysis suggests that State Street's clients have made a reasonably consistent share of the commitments to the main funds of PE firms. The asset owners committed 2.4% of the capital to the funds in the 1980s (of course, the total committed capital of the main funds in which they invested was a much larger share of the industry). In the subsequent three decades, the shares were 4.8%, 6.3%, and 4.3%. This broad look does not suggest dramatic fluctuations in coverage, though the coverage was clearly at a lower level during the 1980s than in subsequent decades.

3. **Alternative Vehicles: An Aggregate Look**

A. Distribution of Use

We first look at the use of different vehicles in general. Table 1 provides an overview of the data set. Of the 108 asset owners active in PE, fully 87 invest in GP-directed vehicles and 69 in discretionary ones. Looking at the number of distinct investments and the dollar size of the commitments, main funds represent 68% of the distinct vehicles and 83% of the capital committed. GP-directed and discretionary vehicles are roughly equal in number, but the former represent 50 billion dollars in capital to the latter's 38 billion.

Figures 1 and 2 depict the temporal distribution of the number of investments in and the dollar commitments to main funds and alternative vehicles, by the year of the vehicles' formation (vintage year in industry parlance) and decade. In the annual charts (1A and 2A), the ebbs-and-flows of fundraising—with the peaks of fundraising in 2000 and 2007-08, the crashes of 2001-02 and 2009, and the recovery in recent years—are apparent. The seeming downturn in activity in 2017 is driven by the fact that the total represents only part of the year's activity. While the volume

of activity in alternative vehicles follows the pattern of the main funds, the increased share in recent years is apparent.

Figures 1B and 2B look at aggregate fundraising by decade (again, the tabulation for the 2010s only runs until mid-2017). Two patterns are apparent from the table. The first is the acceleration of PE activity over time. Dollar commitments to main funds and GP-directed vehicles increased 100-fold from the 1980s to the 2010s, and those to discretionary vehicles more than 200-fold. In part, this pattern may reflect State Street's increasing coverage of LPs after the 1980s. But as highlighted above, the primary driver of this pattern was the increased allocation to PE by LPs over time. Moreover, the share of alternative vehicles among the PE commitments increased. The share of vehicles that were discretionary went from 6.6% in the 1980s to 18.8% in the 2010s; the share of capital committed to these vehicles went from 5.4% to 10.6% (27.3% in 2017). Among the GP-directed vehicles, the increase was from 2.6% to 16.9% of the vehicles, and 1.5% to 13.4% of the capital (9.8% in 2017).

B. *Relative Performance*

We then analyze the performance of these instruments. The first way to examine performance is to simply look at the returns from each class of vehicle. Table 2 presents their performance measured three ways: our baseline measure, the Kaplan-Schoar (2005) PME computed relative to the Russell 3000 (the top panel), as well as two measures often used by practitioners, the internal rate of return (IRR) and the ratio of total value to paid-in capital. (Henceforth, the tables will exclusively focus on PMEs, as this is the standard performance measure used in the academic literature.) Recall that the State Street data report the cash flows

actually realized by the limited partners. As it was difficult to validate some historical cash flow data, we dropped a modest fraction of the vehicles from the analysis.

In this table, we present several performance metrics. First, we use each vehicle as an observation: there is no added weight if multiple asset owners invested, or if the committed capital was relatively larger. We present in each case the 25th and 75th percentiles of performance, as well as the median returns. Second, we compute the weighted average performance, where the weights are the total capital commitments by all the LPs in the State Street population who invested in the same vehicle.

Table 2 shows that there are modest differences in the performance of the three classes of vehicles. The median discretionary and median GP-directed vehicle performed slightly better than the median main fund in terms of PME, though the pattern is not as strong at other reported quartiles. The patterns in the other performance measures are also mixed. Discretionary and GP-directed vehicles outperform in terms of IRR, but one of the sharpest differences is the higher TVPI for main funds (1.37 versus 1.26 and 1.26). This last result may reflect that main funds are on average more mature, given the increased popularity of alternative vehicles in recent years. The dominant impression is the absence of a significant difference in the performance of the various vehicles in aggregate.

One natural question relates to the seeming deviation between the relatively low PMEs generated by our portfolio of main funds and those reported in canonical studies such as Harris, et al. (2016). These differences spring from five differences in our approaches: we (a) calculate

performance through mid-2017, (b) include private debt funds in addition to venture and buyout ones, (c) look at funds based both within and outside the U.S., (d) use the Russell 3000 rather than the S&P 500 as the public market benchmark, and, most importantly, (e) include recent vintage years. If we repeat the calculations in Exhibit II of Harris, et al.—that is, only using U.S. funds in vintage years through 2010 and comparing performance against the S&P 500 (but calculating performance through mid-2017)—we obtain very similar numbers to theirs. For instance, our average PME for buyout funds across all vintage years (calculated using 944 funds, to their 781) is 1.22, as compared to their 1.20. Our average PME for venture funds (computed using 669 funds, to their 1095) is 1.44, as compared to their 1.35.[7] We present the computations for main funds with these adjustments in Appendix B.

Figure 3 looks at the temporal patterns in performance. Focusing on Panel A, which presents the PME-based measures, we see that the return series of the various vehicles tend to track each other by-and-large. The returns of alternative vehicles—which may reflect their less diversified nature—are more volatile than the others. Particularly noticeable are the high PMEs from discretionary investments made in 2009-10, a point also made in practitioner accounts (Leamon, Lerner, and Bosiljevac, 2012).

The comparisons in Table 2 and Figure 3 may be misleading, however, because not all PE groups raised alternative vehicles, and not all investors can invest in all vehicles separately from the main fund. In particular, one might anticipate that asset owners might be disinterested in

[7] The difference reflects the improved performance of venture funds in recent years (including that of older vintages). This improvement is documented in Kaplan (2018).

undertaking discounted arrangements with poorly performing fund managers, while top-tier PE groups might be unwilling to make such concessions.

Table 3 presents what we believe to be a more reasonable comparison. We look at the performance of the alternative vehicles against the main fund that investors presumably could have (or did) also invested in. We compute the difference in the PME between the performance of each alternative vehicle (again computing PMEs using the Russell 3000) and that of the main fund raised by the same group of the same type (e.g., U.S. buyout) immediately prior to the launch of the alternative vehicle. Fifty-eight percent of the alternative vehicles are matched to a main fund begun in the same year as the vehicle; 86% to one in the year of the fund or in the two years prior. If there are no main funds raised in the previous five years, we do not use the alternative vehicle in the analysis. (Thus, the sample size shrinks from 883 to 725 for the discretionary vehicles, and from 819 to 708 for the GP-directed vehicles.) Because there are a few extreme outliers, we winsorized the excess PMEs at the 0.5% and 99.5% level.[8].

One consequence of this methodology is that the alternative vehicles will be raised on average in later years than the main fund to which they are paired. As Harris and co-authors (2016) documented, PMEs have been generally falling over time. This pattern may lead to the seeming underperformance of the alternative vehicles, simply because they were often raised in later vintage years than their paired main funds. While this correction may be excessively conservative (e.g., it may be appropriate to pair a co-investment made in 2007 with the 2004 fund which invested

[8] The exceptions are when we utilize raw returns in Table 2, Panel B of Table 6, Panel A of Table 11, and Table 12, where we winsorize the return data at the 99th percentile.

alongside the LP), we correct for the changing investment climate across the various vintage years. To do this, we compute what we term the Adjusted Excess PME Performance of the alternative vehicles. This measure is defined as follows:

(PME(AV) – Mean PME(MFs, VYAV)) – (PME(PMF) – Mean PME(MFs, VYPMF))

where PME(AV) is the PME of the alternative vehicle, Mean PME(MFs, VYAV) is the mean PME of all main funds of the same vintage year as the alternative vehicle, PME(PMF) is the PME of the paired main fund, and Mean PME(MFs, VYPMF) is the mean PME of all main funds of the same vintage year as the main fund that is paired to the alternative vehicle. If the alternative vehicle and the paired main fund are contemporaneous, the second and fourth terms will cancel out. In other cases, this adjustment will correct for the differences in investment climate between the two years.

The results are robust to the use of alternative methodologies. Another approach is to skip the adjustment for the later vintage years (i.e., delete the second and fourth terms from the equation above). Results using this Unadjusted Excess PME Performance measure are reported in Appendix Table F-1 and are little different. Second, we limit the matches to funds formed in the year of the transaction or the three years prior, which only eliminates 7% of the observations and has little impact on the results. A third approach is that if there are multiple main funds during the five years after the observation, we average the performance of the main funds and use this in the comparison. This methodology tends to depress the performance of the alternative vehicles to a certain degree.

We again look at the simple mean and median of returns across vehicles (counting each vehicle as a single observation), and then at the average returns when weighting each by the size of the State Street LPs' capital commitments to that vehicle. The results in Table 3 suggest some

underperformance by the alternative vehicles relative to their main funds. When using what we regard as the best approach, the weighted average, the discretionary and GP-directed vehicles underperform their paired main funds, with PMEs that are 0.016 and 0.101 lower, respectively. These results suggest again that underperformance is more significant among the larger transactions. The patterns are depicted graphically in Figure 4, which depicts the distribution of the adjusted excess performance of the alternative vehicles of the two types relative to main funds. (Unadjusted excess performance is similar and is reported in Appendix Figure F-1.)

We look at the robustness of the results reported in Tables 2, 3, and F-1 in Appendices C through E. In these supplemental tables, we exclude private debt funds (which are often not considered in the private equity literature), funds formed after 2011 (whose performance may still be difficult to discern), and blocker and offshore funds (whose performance might be affected by tax considerations). We find that these exclusions have little impact on the alternative vehicles' relative performance.

4. Who Uses Alternative Vehicles?

We now turn to examining the differences in the use and performance of alternative vehicles across the general partners in the sample. We ask which types of partnerships rely more heavily on such alternative vehicles and what returns they offer to their investors.

Appendix Table F-3 summarizes the basic characteristics of the general and limited partners. The average GP in the sample was established in 2003, while the mean LP was somewhat older (1998). (Note that in calculating LP age we use the date of the asset owner's first PE

commitment, not the date of the organization's formation.) The total capital commitments garnered over their existence by the GPs from the custodial LPs vary widely, with a mean of just over six hundred million. The mean LP has committed $4.7 billion to private equity.[9]

A. Univariate Patterns across General Partners

We first look at the prevalence of alternative vehicles across different classes of GPs. Of course, their usage is likely to be a function of both their willingness to offer these alternatives, and the interest of asset owners in undertaking these investments.

Table 1 looks at the differences across PE groups with various strategies (each group is assigned to only one strategy, based on where the bulk of its investment activity is focused). Following State Street's typology, we divide the groups into those focused on buyout (including growth capital, private debt, and venture capital transactions). We find a substantial disparity between venture capital-focused groups and the other classes. The amount of capital raised by the venture-focused groups was much more concentrated in main funds, representing 90% of the total raised, as opposed to 82% and 83% for buyout- and private debt-focused groups. (Appendix Table F-4 presents similar statistics for the number of vehicles raised.) Similar patterns appear when we divide funds by size, using data from Preqin to determine the cut-offs. As Appendix Table F-5 reports, the smallest tercile of firms represented raised only 2% of its capital through alternative vehicles, while the corresponding number for the largest tercile was 18%.

[9] The presence of 112 LPs in Appendix Table F-3 (as opposed to the 108 used elsewhere) reflects the fact that four asset owners in the sample had made no private equity commitments as of mid-2017.

In Table 1, a similarly dramatic pattern appeared when we examined differences in the geography of the GPs. In each case, we assign the group to the region in which its headquarters is located. North American GPs are far more likely to employ alternative vehicles: 17% of the capital raised were of this nature. Meanwhile, for groups outside of Europe and North America, alternative vehicles represented only 5% of the capital raised. (Appendix Table F-6 provides a corresponding breakdown of the vehicles raised.)

We then examine the performance across different classes of GPs. We again examine adjusted excess PME performance, comparing the alternative vehicle and the paired main fund. Focusing on weighted average returns, we see in Panel A of Table 4 that alternative vehicles of buyout-focused GPs had consistent negative returns compared to their paired main funds, regardless of the method of adjustment used. VC investments were similarly negative. Private debt strategies had more mixed results.

Panels B and C look at the relationship of excess performance on the one hand and GP size and geography on the other. Again, focusing on the results using weighted-average returns, we find that the performance was poor, frequently at statistically significant levels, for vehicles raised by the largest tercile of firms (with adjusted PME differences of -0.018 and -0.104 for discretionary and GP-managed vehicles) and managers based in North America (-0.070 and -0.132 respectively). The effects were the most negative for GP-directed vehicles.

B. Multiple Regression Analysis

Table 5 looks at the differences in the use of alternative vehicles across GPs of different types in regression analyses. (The definition of all independent variables is in Appendix A.) We use as observations each private equity group that raised funds in a given five-year period (from 1980 to 1984, 1985 to 1989, and so forth). If the PE group raised capital in multiple five-year periods, there are multiple observations; if the group raised no capital in a five-year period, the period is not used as an observation. In each table, we present the results weighted and unweighted by the size of the capital raised by the private equity group in the given five-year period. We also ran the regressions with and without the performance of earlier funds raised by the GP in the previous five-year period as an independent variable. While this variable is of interest, because some firms did not raise funds during the prior period, the sample size shrinks.

The dependent variable in the first six regressions is the ratio of discretionary and GP-directed vehicle commitments to total capital commitments in each five-year period for each general partner. We regress the alternative vehicle share on GP characteristics; in particular, fund size, fund strategy, the region the GP operates in, and the performance of the partnership in the prior five years.

The regressions show that in the more recent period, alternative vehicles as a share of total fundraising has increased. We interact the time trend (T) with dummies for fund size terciles and find that over time the largest groups appear to be more likely to offer these vehicles. We also see that VC funds and debt funds have become less likely to employ alternative vehicles relative to buyout funds. When we break out these patterns by GP-directed and discretionary vehicles in regressions (5) and (6), we see that the effects are primarily driven by the former vehicles. Finally,

we look at the fundraising pattern in relation to past performance of the partnership. We find a strong negative relationship between the ratio of fundraising via alternative vehicles and a partnership's past performance. We again differentiate between GP-directed versus discretionary vehicles and find that the relationship is statistically stronger for the discretionary vehicles, but that the coefficients are of a similar magnitude across both groups. Top-performing funds appear to raise a smaller share of their overall funds via alternative vehicles. However, when we look at the absolute volume of funds raised via alternative vehicles in the seventh regression, we see that the sign flips. Better performing partnerships increase their fundraising in alternative vehicles. But as a share of their total fundraising, alternative vehicles become smaller, which implies that the better performing partnerships are able to grow their main funds even more quickly.

Table 6 looks at the performance of funds, using each alternative vehicle as an observation. In Panel A, we use adjusted excess PME performance as the dependent variable. Three patterns stand out. The first is that the relative performance of discretionary vehicles is significantly lower than that of the GP-directed vehicles at the beginning of the period. However, over time, the performance increases relative to the GP-directed vehicles. This dynamic was less evident in the univariate comparison, where we did not control for the time trend and fund type. The second finding is that alternative investments offered by general partners in the rest of the world significantly outperformed in the early years, though this advantage faded over time. Finally, and most importantly, there is a negative relationship between a partnership's five-year prior performance and the performance of its alternative vehicles (relative to their main fund). The results are not significant in the full sample. But when we examine GP-directed and discretionary vehicles separately, we see a stark asymmetry. GP-directed vehicles offered by groups with

historically high PMEs have lower relative performance compared to those offered by groups with lower PME. In contrast, discretionary vehicles offered by groups with better past performance also performed better, but the relationship is only marginally significant.

These patterns are provocative and support our story of bargaining between GPs and LPs. As discussed above, there are two channels which could explain the lower performance of alternative vehicles. The first is that high-performing groups may exploit their market power by offering alternative vehicles with less favorable economics. Another possibility is that these GPs have higher levels of performance in their main funds, but since they only have limited access to proprietary top deals, the quality of assets in the alternative vehicles is lower. It is important to note that these vehicles might still provide very reasonable returns to investors who are not able to invest in the very top partnerships.

To test this question about the absolute performance of the alternative vehicles, Panel B looks at the raw PME (that is, with no adjustment for the performance of proximate main funds) of each alternative vehicle. We find that top-performing groups are more likely to have high-performing alternative vehicles when we look at raw performance. In the univariate statistics above, we saw that on average alternative vehicles perform as well as the market. This suggests that better performing GPs offer alternative vehicles which perform worse than their main funds, but still offer investors a return that is commensurate with the rest of the market.

We also see that discretionary vehicles perform worse on average, but this difference weakens over time. But in both specifications, we find that funds with better past performance

offer discretionary vehicles that perform better and even outperform the main fund of the partnership. This result seems surprising if GPs have market power as we argued before. However, it might be the result of assortative matching, where better GPs are more likely to be matched with more powerful LPs, which might demand co-investment opportunities.

C. Patterns across Limited Partners

We then look at the patterns across different classes of limited partners in their usage of alternative vehicles. As has been documented in the finance literature (Lerner, Schoar, and Wongsunwai, 2007; Sensoy, Wang, and Weisbach, 2014), PE investment decisions and performance differ across classes of LPs (though in ways that may have varied over time). These considerations may also have affected the interest in alternative vehicles by different classes of limited partners. Of course, their usage of alternative vehicles was also likely to be a function of the willingness of GPs to offer them such investment opportunities.

Panel A of Table 7 looks at the differences across classes of limited partners. We see substantial variations across the different investor types. The most striking pattern is related to the share of the total capital devoted to alternative vehicles, where public pensions stand out. While their $31 billion of commitments to alternative vehicles was the largest of any class of investor, they had so much committed to traditional funds that their 12% share of commitments was considerably smaller than every other class of investor, such as sovereign wealth funds, endowments and foundations, and private pensions. (Appendix Table F-7 looks similarly at the number of commitments by LP.)

Panel B of Table 7 looks at the use of these vehicles across limited partners of different geographies. LPs based outside of Europe and the North America (22% of total capital), and especially European ones (28%), made far more use of alternative vehicles than the North American asset owners (14%). (Appendix Tables F-8 and F-9 look similarly at the number of investments and at LP size.)

The next two tables look at the performance of the alternative vehicle investments by limited partner type. In Table 8, we see that funds-of-funds had consistently negative relative performance across all three measures, with weighted average adjusted PME differences of -0.144 and -0.106 for discretionary and GP-managed vehicles, respectively (both statistically significant). Continuing to focus on weighted average relative returns, the alternative investments of public pensions were also consistent underperformers (-0.083 and -0.065 respectively), though they look better when we examine medians. Insurance and finance institutions, in contrast, did quite well in their alternative investments, with adjusted excess PMEs of 0.177 and 0.013 for discretionary and GP-directed vehicles, respectively. And finally, SWFs did quite poorly on GP-directed investments (-0.213) but moderately well on the discretionary vehicles (0.082). (When we look across LPs of different sizes in Appendix Table F-10, we find that the top largest tercile—likely to be dominated by sovereigns and public pensions—had much lower relative performance of GP-directed vehicles, consistent with the results in Table 8.)

In Table 9, we examine the differences across LPs with different geographic bases. We see a disparity, with asset owners based in North America consistently underperforming in their alternative vehicle investments: their weighted average adjusted PME difference is -0.041 for both

discretionary and GP-managed vehicles. European LPs did better in alternative vehicle investing (+0.18 and -0.02 respectively).

D. Matching between LPs and GPs

In Table 10, we first analyze which types of LPs do better in their alternative vehicle investments. Each investment by an individual LP in an alternative vehicle is an observation. The dependent variable is the vehicle's adjusted excess PME performance. We include controls for the features of the LPs and GPs. We see the superior performance of insurers (which may have more experience in many instances with alternative vehicle investing, as alluded to above), endowments and foundations (who have historically been skilled private market investors, as documented by Lerner, Schoar, and Wongsunwai, 2007), and private pensions. LPs with historically high performance also do better in selecting alternative vehicles, which may suggest a persistence-of-skill effect (consistent with Cavagnaro et al., 2017). Interestingly, LPs with historically high performance do better in both GP-directed and discretionary vehicles. This suggests that there is a group of LPs that has the skill to identify good co-investment vehicles but also does well with GP-directed vehicles.

We then look at the matching between GPs and LPs. In Table 11, we present cross-tabs, where each investment by an individual LP in an alternative vehicle is an observation. The performance variables are the vehicle's PME; its adjusted excess PME; and its PME less the weighted average PME of main funds that it has invested in during the prior five years. We characterize the performance of the LP and the GP in four ways: (1) both the LP and GP have performed above median over the past five years, (2) LP and GP below median, (3) LP above

median and GP above, and (4) *vice versa*. Weighted averages are computed for each cell using commitment size.

Panel A of Table 11 reveals that the strongest performance is associated with LPs with successful track records investing in GPs with above-average performance. For discretionary funds, the weighted average PME is 1.19 and for GP-directed ones, it is 1.05. Meanwhile, investments made by LPs in the bottom half of the performance distribution into GPs with poor performance have the lowest PMEs, around 0.68 and 0.80 in discretionary and GP-directed funds, respectively. Interestingly, low-performing LPs have middling performance when investing in the alternative vehicles of high-performing GPs, around 0.93 on average. Finally, even high-performance LPs have mediocre returns across the board when investing in alternative vehicles of bad GPs, 0.94 on average. These results suggest that the match between LP and GP types is very important for understanding return dynamics.

When we examine adjusted excess PME in Panel B of Table 11, we see that above-average LPs are offered alternative vehicles by their GPs that perform above these LPs' corresponding main funds. For example, columns (1) and (2) in Panel B show that above-average LPs have a 0.08 premium in PME relative to the associated main fund when investing in alternative vehicles of a top GP. But even when these top LPs invest in alternative vehicles of a below-average GP, the alternative vehicles on average have a 0.10 PME premium over their main funds. The mirror image emerges for below-average LPs. In columns (3) and (4) of Panel B, we see that alternative vehicles that below-average LPs invest in have significantly lower performance than the associated main

funds. The difference in PME is particularly large when investing in alternative vehicles of top GPs, on average 0.23. But even for bottom GPs, it is negative 0.11 on average.

In Panel C, we compare the average performance of alternative vehicles against the performance of all the other main funds that a given LP invested in over the same time period. This exercise allows us to test how GPs use alternative vehicles to differentiate between LPs and their investment opportunities: For top LPs investing in top GPs, alternative vehicles (especially discretionary vehicles) beat the rest of the LP's portfolio, outperforming the main funds they chose. This result suggests that top GPs use these vehicles to provide improved opportunities for their best investors. Similarly, the performance of alternative vehicles of top GPs invested in by lower-tier LPs beat the other main funds in which these LPs invest. This pattern holds even though, as we saw in Panel B, the performance of low-performing LPs investing in top GPs is much lower than the main fund of the same partnerships. This asymmetry suggests that top LPs differentiate between their more and less preferred investors. But even for low-performing LPs, these investments are still better than the rest of the opportunities they have access to. Finally, while Panel B showed that top LPs have relatively better performance than lower-performing LPs when investing in alternative vehicles of bad GPs, the overall level of performance is much poorer than the average main funds in which they invest.

In sum, these results suggest that GPs recognize the outside options of their investors. This effect is especially strong for GP-directed funds where LPs do not have much ability to select deals. Therefore, we believe that the results are not just an expression of poor selection by LPs, but reflect the differentiation of deals that are offered to different types of LPs.

Table 12 looks at the first of the cross-tabs reported in Table 11 in greater depth, using regression analyses which allows us to control for fund characteristics and time effects. Each investment by an individual LP in an alternative vehicle is an observation. The dependent variable is the vehicle's raw PME. We regress the performance of the alternative vehicle on a measure of the LP's and GP's performance in their entire portfolio, with controls for the GP size and strategy. In Columns 1, 3, and 5, we use the average performance over the total PE portfolio and the entire period an LP or GP is in our sample. This is a time-invariant measure of LP and GP performance, which captures cross-sectional differences in performance. We then classify LPs into above-median versus below-median performers. We do the same for the GPs. We form four dummies to characterize the match between the LP and the GP: (1) LP and GP above median, (2) LP and GP below median, (3) LP above and GP below median, and (4) *vice versa*. In the even columns, we repeat the same regression set–up, but use as the performance measure the average volume-weighted PME in the five years prior to the inception of the alternative vehicle. We include GP fixed effects here, since this measure of performance varies over time.

The results show that the PME of an alternative vehicle where the LP and the GP are above-median performers is 0.38 points higher than the base category of a below-median GP–LP pair. The dummies on the uneven matches is 0.18 points higher than the base category. All these differences are statistically significant. When breaking the results out by type of alternative vehicles, we find that the magnitudes of the results are larger for the discretionary vehicles, but the differences are also significant for the GP-directed vehicles. As discussed above, these results are in line with a bargaining explanation, where the top LPs receive better returns, even conditional on the performance of the GPs with which they invest.

In Table F-11, we explore the robustness of these results to controlling for the nature of the relationship between the limited and general partners. One might worry that established LPs with known track records might get into better alternative vehicles because they have longstanding relationships with many GPs. Younger or less well-performing LPs might not have access to these same relationships. In that case, the match could proxy for prior relationships or reduced information asymmetries on the side of some LPs, rather than their outside options. For that reason, we add to the specification a dummy variable that denotes whether the LP had invested in any of a GP's main funds before investing in the alternative vehicle with the GP. Even after controlling for the presence of a prior relationship, the earlier results that performance depends on the match between the general and limited partners remain very similar in magnitude and significance.

5. **Conclusions**

Using hitherto-unexplored custodial data, we take a broad look at private equity investments by 108 asset owners, including transactions involving assets outside the traditional fund structure. We show that alternative vehicles have been a major—and rapidly growing—portion of these investors' portfolios over the past four decades. We also document the disparity in the performance across the limited and general partners participating in such vehicles, as well as across the two broad classes of alternative vehicles. The results suggest that the previously established puzzles of private equity performance might be disappearing. Partnerships seem to be using alternative vehicles to tailor investment returns based on the outside opportunities of different investors. Our results also suggest that the sophistication of an LP within the private

equity space becomes more important as partnerships offer a gamut of different vehicles: the performance of alternative vehicles varies with the past experience of the LPs.

Several avenues for future research follow naturally from this paper. One of these relates to the contractual terms in these "outside-the-box" investments. While the partnership agreements between GPs and LPs in main funds have been well scrutinized, we know very little about the nature of these alternative vehicle arrangements. In this analysis, as in the earlier literature on co-investments, we only observe the net cash flows to the LPs, not the payments that went to the GPs. Another intriguing question is whether the patterns seen here are replicated in other asset classes. One natural arena to investigate is real estate, where "blind pool" funds were far later in arriving than in PE. Understanding how the use of such "outside the box" investments varies across asset classes, and the performance of such transactions, are important and interesting open questions.

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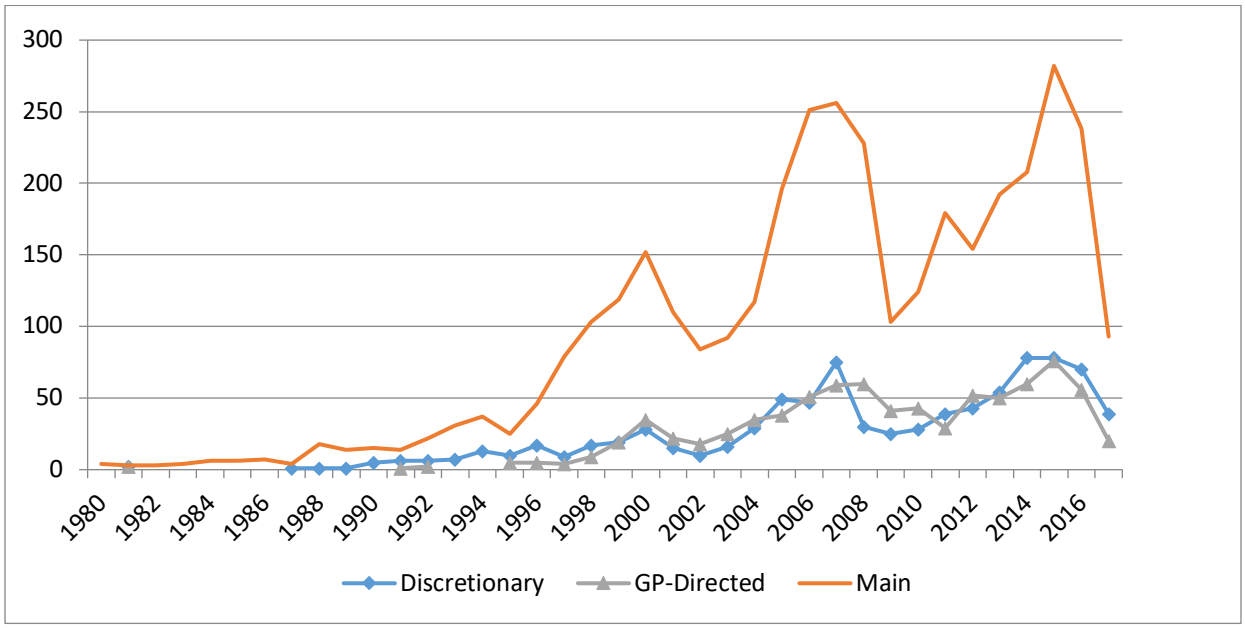
Figure 1: Vehicle Numbers by Vintage Year.
Panel A: Sum during each vintage year.



Panel B: Sum during each decade.

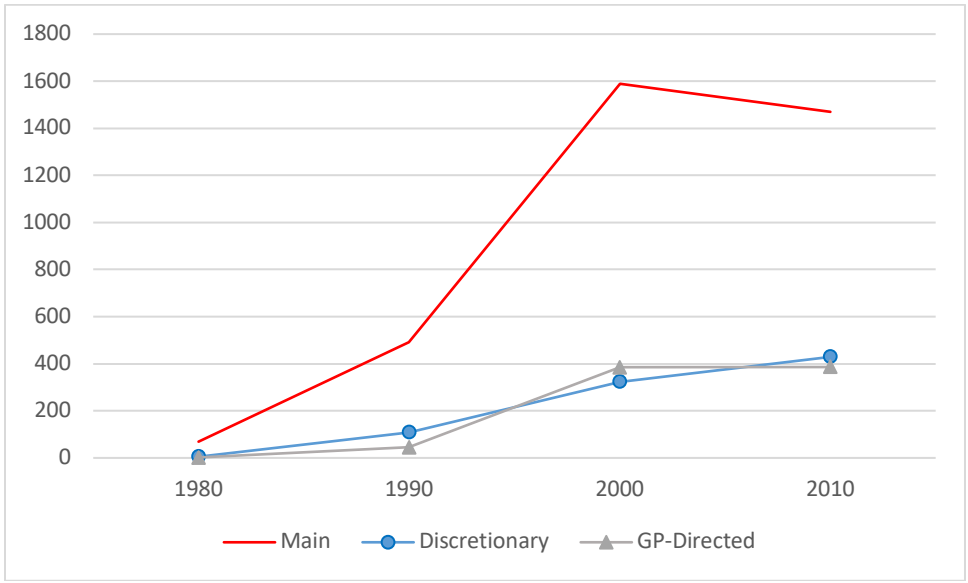
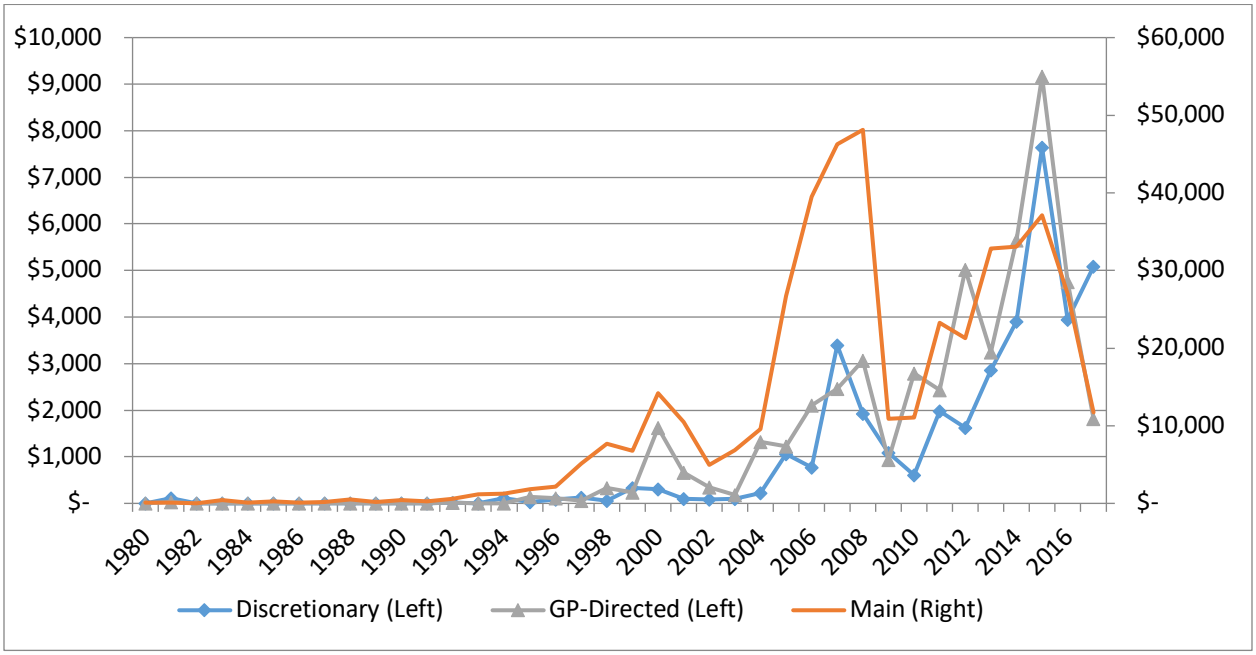


Figure 2: Vehicle Size (Commitments USD Millions) by Vintage Year.
Panel A: Sum during each vintage year.



Panel B: Sum during each decade.

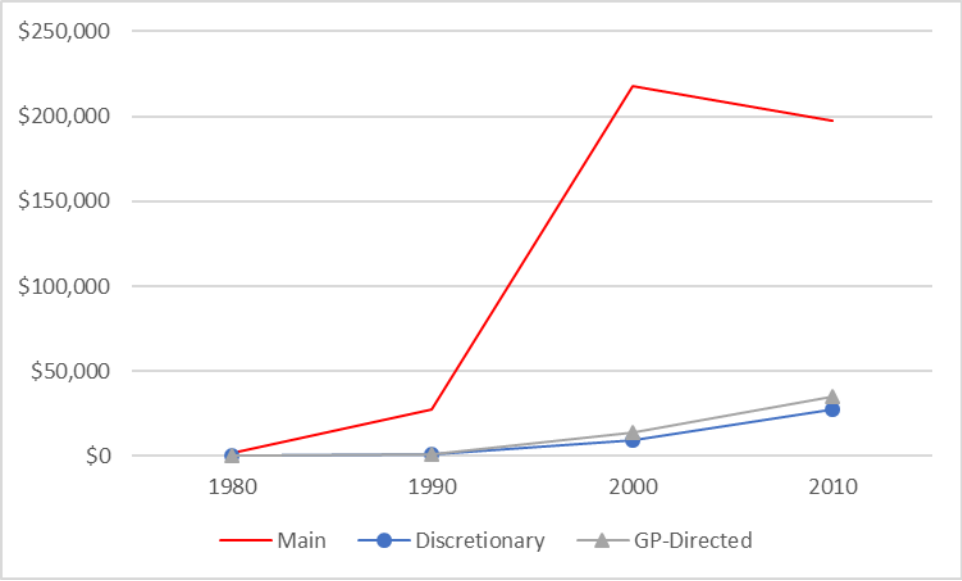
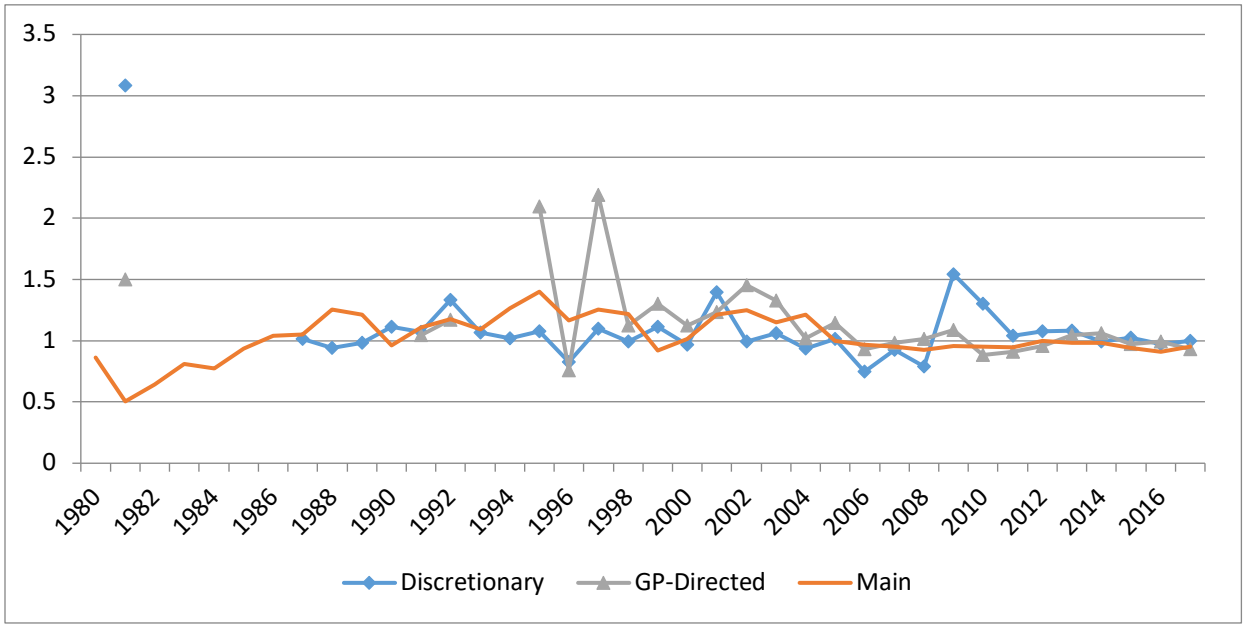
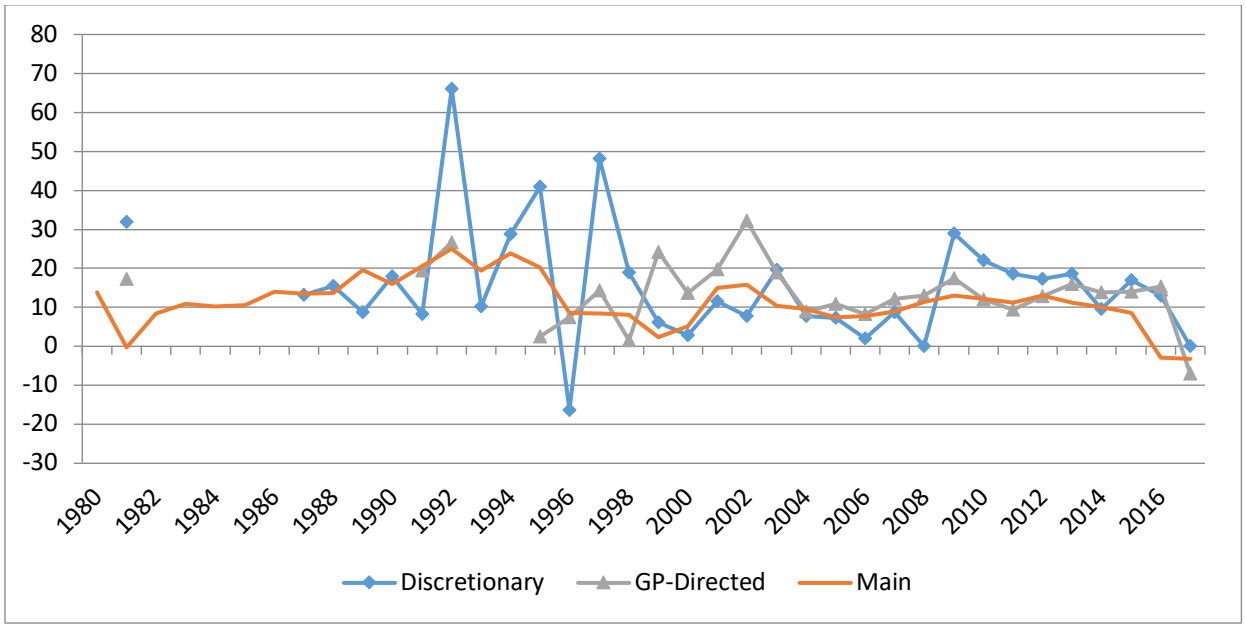


Figure 3: Performance by Vehicle Type and Vintage Year.
Panel A. Median PME (relative to the Russell 3000) by fund type and vintage year.



Panel B. Median IRR by fund type and vintage year.



Panel C. Median TVPI by fund type and vintage year.

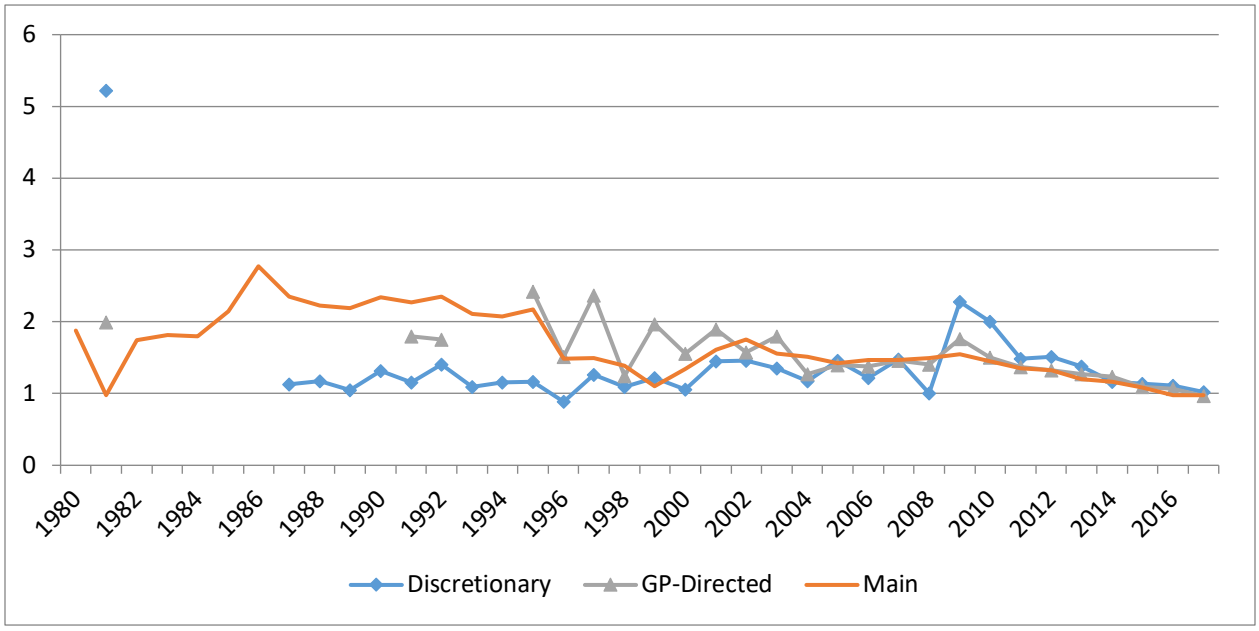
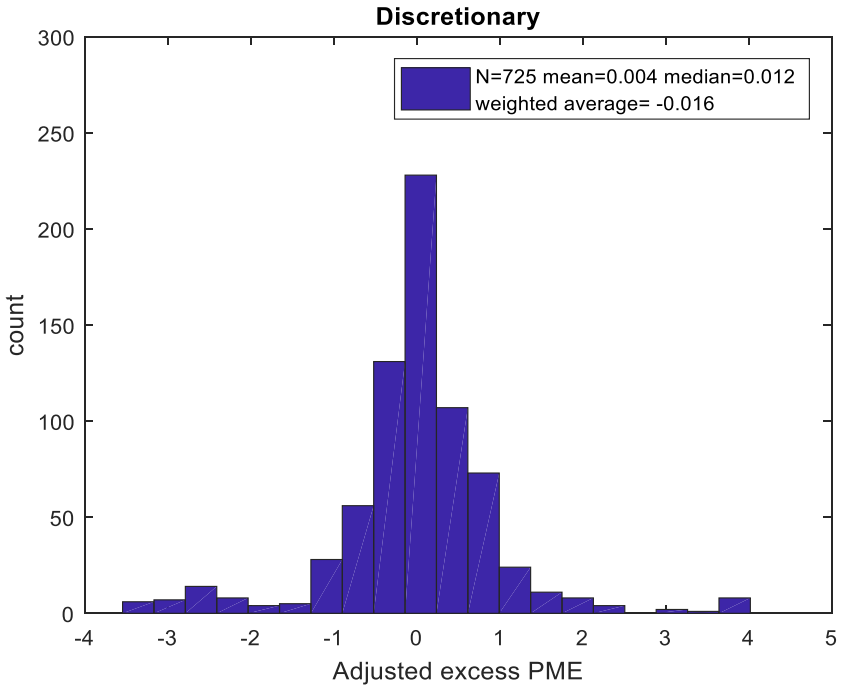


Figure 4: Adjusted Excess Performance of Alternative Vehicles, by Vehicle Type. Excess PMEs are winsorized at the 0.5th and 99.5th percentiles.
Panel A. Histogram of adjusted excess PME of discretionary vehicles.



Panel B. Histogram of adjusted excess PME performance of GP-directed vehicles.

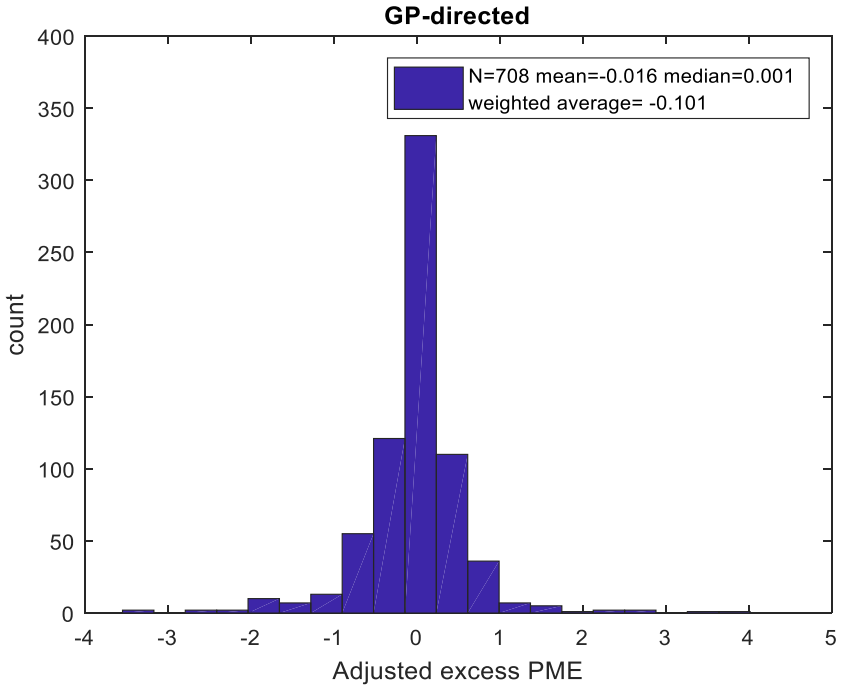


Table 1: Vehicle Count, Vehicle Investment Count, GP Count, LP Count, and Total and Average USD LP Commitment (USD MM), by Vehicle Type, as well as Breakdown by Fund Type.

Vehicle type	Main		Discretionary		GP-Directed	
Vehicle count	3620	68.0%	883	16.6%	819	15.4%
Investment count	15553	78.7%	1800	9.1%	2411	12.2%
GP count	868		197		261	
LP count	108		69		87	
Total LP Commitment	444190	83.5%	37874	7.1%	49848	9.4%
Average LP commitment	29		21		21	
Total Commitment to Buyout	333084	62.6%	30140	5.7%	40379	7.6%
Total Commitment to Private Debt	57231	10.8%	5657	1.1%	5669	1.1%
Total Commitment to Venture Capital	53875	10.1%	2077	0.4%	3800	0.7%
Total Commitment to European GPs	58238	10.9%	4067	0.8%	7825	1.5%
Total Commitment to North American GPs	367828	69.1%	33167	6.2%	41267	7.8%
Total Commitment to Rest of World GPs	18125	3.4%	640	0.1%	756	0.1%

Table 2: Performance by Vehicle Type. The performance metrics reported are Kaplan-Schoar Public Market Equivalent versus the Russell 3000, Internal Rate of Return, and Total Value divided by Paid-In Capital. The calculations are presented for all main funds in the sample, all main funds with an associated alternative vehicle, and the two classes of alternative vehicles. Weighted averages are by vehicle's total commitment by limited partners in the sample. PME, IRR, and TVPI are winsorized at 99th percentile.

			Russell 3000 KS PME		
Vehicle type	**N**	**25%**	**50%**	**75%**	**Weighted Average**
Main	3562	1.23	0.97	0.77	1.02
Main AV-Associated	679	1.20	0.97	0.76	1.02
Discretionary	840	1.23	0.99	0.77	0.99
GP-Directed	799	1.24	1.01	0.81	0.97

			IRR		
Vehicle type	**N**	**25%**	**50%**	**75%**	**Weighted Average**
Main	3562	0.17	0.09	0.00	0.09
Main AV-Associated	679	0.17	0.09	0.00	0.10
Discretionary	840	0.24	0.10	-0.01	0.09
GP-Directed	799	0.22	0.12	0.03	0.11

			TVPI		
Vehicle type	**N**	**25%**	**50%**	**75%**	**Weighted Average**
Main	3562	1.70	1.28	1.00	1.37
Main AV-Associated	679	1.66	1.22	1.00	1.37
Discretionary	840	1.57	1.16	0.95	1.26
GP-Directed	799	1.70	1.32	1.05	1.26

Table 3: Adjusted Excess PME Performance of Alternative Vehicles. The performance metric used is the Kaplan-Schoar Public Market Equivalent versus the Russell 3000. The performance of each alternative vehicle is compared to that of the most recent main fund raised by the same group of the same type within the past five years, with an adjustment for the mean PME for main funds in the vintage of the vehicles' formation. (See text of the paper for precise definition.) Weighted averages are computed using commitment size. Excess PMEs are winsorized at the 0.5th and 99.5th percentiles.

Vehicle type	**N**	**Weighted average**	**p-value**	**Average**	**p-value**	**median**
All	1433	-0.066	0.001	-0.006	0.795	0.004
Discretionary	725	-0.016	0.657	0.004	0.912	0.012
GP-Directed	708	-0.101	0.000	-0.016	0.499	0.001

Table 4: Adjusted Excess Performance of Alternative Vehicles by GP Strategy, Size, and Geography. The performance metric used is the Kaplan-Schoar Public Market Equivalent versus the Russell 3000. The performance of each alternative vehicle is compared to that of the most recent main fund raised by the same group of the same type within the past five years, with an adjustment for the mean PME for main funds in the vintage of the vehicles' formation. (See text of the paper for precise definition.) Weighted averages are computed using commitment size. Excess PMEs are winsorized at the 0.5th and 99.5th percentiles.
Panel A: GP strategy.

GP Strategy	Vehicle type	N	Weighted average	p-Value	Average	p-Value	Median
Buyout	Discretionary	559	-0.045	0.294	-0.029	0.513	0.009
Buyout	GP-Directed	499	-0.102	0.000	-0.003	0.911	0.007
Private Debt	Discretionary	51	0.235	0.005	0.249	0.007	0.137
Private Debt	GP-Directed	76	-0.109	0.081	-0.029	0.715	0.002
Venture Capital	Discretionary	115	-0.107	0.047	0.057	0.424	0.000
Venture Capital	GP-Directed	133	-0.059	0.083	-0.055	0.303	-0.006

Panel B: GP size.

GP Size	Vehicle type	N	Weighted average	p-Value	Average	p-Value	Median
Bottom	Discretionary	7	0.232	0.567	0.353	0.688	0.099
Bottom	GP-Directed	8	-0.054	0.688	-0.065	0.731	-0.094
Middle	Discretionary	51	0.102	0.397	0.331	0.035	0.011
Middle	GP-Directed	96	0.032	0.398	-0.031	0.553	0.001
Top	Discretionary	667	-0.018	0.619	-0.025	0.507	0.009
Top	GP-Directed	604	-0.104	0.000	-0.013	0.624	0.003

Panel C: GP geography.

GP Region	Vehicle type	N	Weighted average	p-Value	Average	p-Value	Median
NA	Discretionary	637	-0.070	0.051	-0.016	0.690	0.004
NA	GP-Directed	547	-0.132	0.000	-0.038	0.158	0.001
Europe	Discretionary	73	0.436	0.003	0.184	0.149	0.105
Europe	GP-Directed	127	0.077	0.057	0.086	0.092	0.007
RoW	Discretionary	15	-0.077	0.573	-0.040	0.823	0.002
RoW	GP-Directed	34	-0.154	0.023	-0.032	0.672	-0.025

Table 5. Analysis of Alternative Vehicle Activity by GP Characteristics. The dependent variable in the first six columns is the ratio of discretionary and GP-directed vehicle commitments to total capital commitments in each five-year period for each GP. The dependent variable in last column is the log10 of 1 + the dollar commitment to alternative vehicles in each five-year period for each GP. Weighted regressions use the sum of the GPs' capital commitments in the current five-year period as weights. GP prior five-year mean PME is an average over the previous five-year period, weighted by vehicle commitments. The reference categories are North America (US & Canada) for GP region, buyout for GP strategy, and bottom tercile for GP size. Standard errors are clustered by GP and shown in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% level, respectively. T is a five-year series time trend variable starting with 0 for 1980-84.

	All alternative vehicles (ratio)				**Discretionary (ratio)**	**GP-Directed (ratio)**	**All alternative vehicles (level)**
Variables	**Unweighted**	**Weighted**	**Unweighted**	**Weighted**	**Weighted**	**Weighted**	**Weighted**
GP_region_{Europe}	0.160	0.173	0.192	0.261	-0.044	0.305	0.745
	(0.075)**	(0.112)	(0.088)**	(0.131)**	(0.116)	(0.084)***	(1.901)
GP_region_{RoW}	0.054	0.187	-0.156	0.054	-0.091	0.144	8.571
	(0.076)	(0.132)	(0.168)	(0.233)	(0.173)	(0.111)	(5.713)
$GP\_strategy_{VC}$	0.010	0.321	0.002	0.190	0.069	0.120	-2.129
	(0.037)	(0.110)***	(0.062)	(0.098)*	(0.078)	(0.063)*	(1.656)
$GP\_strategy_{Debt}$	0.014	0.263	0.024	0.370	0.207	0.163	4.783
	(0.051)	(0.116)**	(0.104)	(0.179)**	(0.122)*	(0.082)**	(4.030)
GP_size_{Middle}	-0.115	-0.025	-0.035	0.006	0.004	0.002	1.578
	(0.032)***	(0.046)	(0.067)	(0.084)	(0.052)	(0.049)	(1.806)
GP_size_{Top}	-0.082	-0.105	-0.085	-0.052	-0.017	-0.035	3.107
	(0.036)**	(0.074)	(0.059)	(0.076)	(0.052)	(0.047)	(1.679)*
$GP\_prior\_5yr\_PME$			-0.020	-0.061	-0.030	-0.032	0.693
			(0.009)**	(0.027)**	(0.014)**	(0.019)	(0.312)**
T	0.004	0.044	0.020	0.060	0.026	0.034	0.392
	(0.006)	(0.013)***	(0.015)	(0.018)***	(0.014)*	(0.012)***	(0.314)
$T \times GP\_region_{Europe}$	-0.026	-0.032	-0.031	-0.046	0.005	-0.051	-0.177
	(0.014)*	(0.024)	(0.017)*	(0.027)*	(0.024)	(0.017)***	(0.305)
$T \times GP\_region_{RoW}$	-0.019	-0.050	0.010	-0.033	0.005	-0.038	-1.679
	(0.014)	(0.024)**	(0.031)	(0.041)	(0.030)	(0.019)**	(0.911)*
$T \times GP\_strategy_{VC}$	-0.004	-0.067	-0.005	-0.049	-0.018	-0.031	0.015
	(0.008)	(0.019)***	(0.013)	(0.020)**	(0.015)	(0.013)**	(0.292)
$T \times GP\_strategy_{Debt}$	-0.003	-0.051	-0.008	-0.072	-0.038	-0.035	-1.079
	(0.011)	(0.022)**	(0.019)	(0.029)**	(0.020)*	(0.015)**	(0.674)
$T \times GP\_size_{Middle}$	0.033	0.013	0.020	0.004	0.003	0.002	-0.028
	(0.007)***	(0.009)	(0.015)	(0.017)	(0.010)	(0.010)	(0.328)
$T \times GP\_size_{Top}$	0.040	0.046	0.037	0.031	0.014	0.017	0.348
	(0.007)***	(0.013)***	(0.013)***	(0.014)**	(0.010)	(0.009)*	(0.302)
Observations	2161	2161	1164	1164	1164	1164	1164
Adjusted R-squared	0.070	0.133	0.061	0.145	0.084	0.085	0.145

Table 6. Regression Analyses of Alternative Vehicle Performance by GP Characteristics. Each alternative vehicle is an observation; the dependent variable is the adjusted excess PME performance in Panel A and the PME performance in Panel B. (See text for definitions.) Weighted regressions use the sum of the vehicles' capital commitments as weights. GP prior five-year mean PME is an average over the previous five years, weighted by vehicle commitments. The reference categories are North America (US & Canada) for GP region, buyout for GP strategy, and bottom tercile for GP size. T is a time trend variable equal to vintage year less 1980. Standard errors are clustered by GP and shown in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% level, respectively. Excess PMEs are winsorized at the 0.5th and 99.5th percentiles in Panel A; and at the 99th percentile in Panel B.

Panel A. Adjusted excess PME performance of alternative vehicle as the dependent variable.

	All Alternative vehicles				**Discretionary**	**GP-Directed**
Variables	**Unweighted**	**Weighted**	**Unweighted**	**Weighted**	**Weighted**	**Weighted**
$Vehicle\_type_{Discretionary}$	-1.270	-1.615	-1.321	-1.670		
	(0.561)**	(1.189)	(0.554)**	(1.228)		
GP_region_{Europe}	0.282	-0.541	0.295	-0.576	-2.052	0.096
	(0.588)	(0.854)	(0.591)	(0.918)	(1.778)	(0.769)
GP_region_{RoW}	1.782	1.654	1.020	1.187	2.561	-0.039
	(0.693)**	(0.825)**	(0.736)	(0.780)	(1.306)**	(1.211)
$GP\_strategy_{VC}$	0.946	0.161	1.142	0.326	2.355	-0.896
	(0.521)*	(0.720)	(0.573)**	(0.803)	(1.697)	(0.775)
$GP\_strategy_{Debt}$	0.855	0.506	0.726	0.496	1.027	-0.342
	(0.567)	(1.178)	(0.594)	(1.256)	(1.811)	(1.055)
GP_size_{Middle}	0.954	-1.517	2.062	-2.198	-0.376	1.844
	(2.022)	(1.374)	(3.090)	(1.469)	(1.619)	(0.961)*
GP_size_{Top}	1.496	-2.300	3.131	-2.628	-2.553	2.015
	(2.009)	(1.318)*	(3.050)	(1.484)*	(1.498)*	(1.069)*
$GP\_prior\_5yr\_PME$			-0.067	-0.031	0.643	-0.297
			(0.104)	(0.180)	(0.336)*	(0.139)**
T	0.058	-0.080	0.117	-0.091	-0.020	0.054
	(0.071)	(0.047)*	(0.103)	(0.053)*	(0.058)	(0.028)*
$T \times Vehicle\_type_{Discretionary}$	0.046	0.054	0.048	0.055		
	(0.019)**	(0.036)	(0.019)**	(0.037)		
$T \times GP\_region_{Europe}$	-0.006	0.026	-0.006	0.028	0.072	0.004
	(0.020)	(0.030)	(0.020)	(0.032)	(0.059)	(0.025)
$T \times GP\_region_{RoW}$	-0.060	-0.054	-0.037	-0.040	-0.080	-0.002
	(0.023)***	(0.025)**	(0.024)	(0.024)*	(0.039)**	(0.038)
$T \times GP\_strategy_{VC}$	-0.034	-0.006	-0.039	-0.010	-0.075	0.032
	(0.018)*	(0.024)	(0.019)**	(0.026)	(0.051)	(0.027)
$T \times GP\_strategy_{Debt}$	-0.027	-0.012	-0.023	-0.012	-0.023	0.011
	(0.020)	(0.036)	(0.020)	(0.039)	(0.057)	(0.033)
$T \times GP\_size_{Middle}$	-0.035	0.050	-0.078	0.070	0.011	-0.062
	(0.071)	(0.044)	(0.105)	(0.049)	(0.054)	(0.033)*

$T \times GP\_size_{Top}$	-0.056	0.072	-0.115	0.081	0.073	-0.072
	(0.071)	(0.042)*	(0.104)	(0.049)*	(0.049)	(0.036)**
Observations	1433	1433	1359	1359	702	657
Adjusted R-squared	0.055	0.049	0.062	0.049	0.095	0.027

Panel B. PME performance of alternative vehicle as the dependent variable.

	All Alternative vehicles				**Discretionary**	**GP-Directed**
Variables	**Unweighted**	**Weighted**	**Unweighted**	**Weighted**	**Weighted**	**Weighted**
$Vehicle\_type_{Discretionary}$	-0.809	-1.019	-0.559	-0.777		
	(0.269)***	(0.469)**	(0.272)**	(0.434)*		
GP_region_{Europe}	-0.221	-0.067	-0.278	-0.295	-2.022	0.298
	(0.461)	(0.645)	(0.493)	(0.692)	(1.276)	(0.386)
GP_region_{RoW}	-0.093	-0.154	-0.584	-0.073	1.951	-1.418
	(0.903)	(0.706)	(0.588)	(0.471)	(0.849)**	(0.580)**
$GP\_strategy_{VC}$	-0.254	-0.462	0.197	-0.030	1.299	-0.633
	(0.357)	(0.488)	(0.352)	(0.506)	(1.113)	(0.421)
$GP\_strategy_{Debt}$	-0.618	-0.765	-0.687	-0.693	-0.578	-0.992
	(0.289)**	(0.646)	(0.309)**	(0.758)	(1.221)	(0.510)*
GP_size_{Middle}	1.218	-0.910	1.637	-2.218	-0.794	0.975
	(1.580)	(1.093)	(2.416)	(1.075)**	(1.327)	(1.001)
GP_size_{Top}	1.906	-1.004	2.655	-2.275	-2.002	1.152
	(1.567)	(1.062)	(2.384)	(1.030)**	(0.989)**	(0.948)
$GP\_prior\_5yr\_PME$			0.290	0.375	0.925	0.163
			(0.065)***	(0.123)***	(0.252)***	(0.057)***
T	0.041	-0.061	0.082	-0.093	-0.039	0.012
	(0.058)	(0.035)*	(0.086)	(0.035)***	(0.033)	(0.033)
$T \times Vehicle\_type_{Discretionary}$	0.028	0.034	0.020	0.026		
	(0.009)***	(0.014)**	(0.009)**	(0.013)**		
$T \times GP\_region_{Europe}$	0.009	0.008	0.011	0.015	0.065	-0.005
	(0.015)	(0.023)	(0.016)	(0.024)	(0.044)	(0.013)
$T \times GP\_region_{RoW}$	0.001	0.003	0.015	-0.001	-0.060	0.040
	(0.027)	(0.021)	(0.018)	(0.015)	(0.027)**	(0.018)**
$T \times GP\_strategy_{VC}$	0.004	0.011	-0.009	-0.003	-0.044	0.018
	(0.011)	(0.017)	(0.011)	(0.017)	(0.036)	(0.013)
$T \times GP\_strategy_{Debt}$	0.017	0.023	0.019	0.021	0.021	0.029
	(0.010)*	(0.021)	(0.010)*	(0.025)	(0.041)	(0.015)*
$T \times GP\_size_{Middle}$	-0.045	0.037	-0.066	0.083	0.029	-0.020
	(0.059)	(0.035)	(0.088)	(0.036)**	(0.043)	(0.034)
$T \times GP\_size_{Top}$	-0.068	0.039	-0.099	0.081	0.058	-0.028
	(0.058)	(0.034)	(0.087)	(0.034)**	(0.032)*	(0.033)
Observations	1433	1433	1359	1359	702	657
Adjusted R-squared	0.025	0.041	0.053	0.083	0.130	0.104

Table 7: Breakdown of Commitment Amount (USD Millions) by LP Type. Note one vehicle may have multiple LPs.
Panel A. By LP type.

LP type	Vehicle type			
	Main	Discretionary	GP-Directed	Grand Total
Fund-of-Funds	$21,897 (4.1%)	$948 (0.2%)	$4,996 (0.9%)	$27,841 (5.2%)
Foundation & Endowment	$21,383 (4.0%)	$2,756 (0.5%)	$3,529 (0.7%)	$27,668 (5.2%)
Insurance & Financial institution	$58,794 (11.1%)	$3,426 (0.6%)	$10,833 (2.0%)	$73,053 (13.7%)
Private Pension	$18,345 (3.4%)	$2,702 (0.5%)	$2,592 (0.5%)	$23,639 (4.4%)
Public Pension	$239,949 (45.1%)	$17,441 (3.3%)	$13,789 (2.6%)	$271,179 (51.0%)
Sovereign Wealth Fund	$83,823 (15.8%)	$10,601 (2.0%)	$14,109 (2.7%)	$108,533 (20.4%)
Grand Total	$444,191 (83.5%)	$37,874 (7.1%)	$49,848 (9.4%)	$531,913 (100.0%)

Panel B. By LP geography.

Vehicle type	LP geography			
	Europe	North America	Rest of World	Grand Total
Main	$27,671 (5.2%)	$328,170 (61.7%)	$88,349 (16.6%)	$444,190 (83.5%)
Discretionary	$3,713 (0.7%)	$23,500 (4.4%)	$10,661 (2.0%)	$37,874 (7.1%)
GP-Directed	$7,044 (1.3%)	$28,080 (5.3%)	$14,724 (2.8%)	$49,848 (9.4%)
Grand Total	$38,428 (7.2%)	$379,750 (71.4%)	$113,734 (21.4%)	$531,912 (100.0%)

Table 8: Adjusted Excess Performance of Alternative Vehicles by LP Type. The performance metric used is the Kaplan-Schoar Public Market Equivalent versus the Russell 3000. The performance of each alternative vehicle is compared to that of the most recent main fund raised by the same group of the same type within the past five years, with an adjustment for the mean PME for main funds in the vintage of the vehicles' formation. (See text of the paper for precise definition.) Weighted averages are computed using commitment size. Excess PMEs are winsorized at the 0.5th and 99.5th percentiles. One vehicle may have more than one LP.

LP type	Vehicle type	N	Weighted Average	p-Value	Average	p-Value	Median
Fund-of-Funds	Discretionary	35	-0.144	0.025	-0.107	0.385	-0.075
	GP-Directed	89	-0.106	0.088	-0.078	0.374	-0.021
Foundation & Endowment	Discretionary	53	0.064	0.420	0.026	0.773	-0.039
	GP-Directed	74	-0.028	0.319	0.002	0.949	0.005
Insurance & Financial institution	Discretionary	162	0.177	0.002	0.247	0.000	0.081
	GP-Directed	390	0.013	0.677	0.050	0.187	0.020
Private Pension	Discretionary	29	0.195	0.002	-0.041	0.723	0.027
	GP-Directed	54	-0.001	0.985	-0.045	0.567	-0.016
Public Pension	Discretionary	390	-0.083	0.205	-0.044	0.470	0.038
	GP-Directed	120	-0.065	0.122	0.023	0.606	0.013
Sovereign Wealth Fund	Discretionary	102	0.082	0.093	-0.005	0.933	-0.086
	GP-Directed	100	-0.213	0.004	-0.220	0.004	-0.063

Table 9: Adjusted Excess Performance of Alternative Vehicles by LP Geography. The performance metric used is the Kaplan-Schoar Public Market Equivalent versus the Russell 3000. The performance of each alternative vehicle is compared to that of the most recent main fund raised by the same group of the same type within the past five years, with an adjustment for the mean PME for main funds in the vintage of the vehicles' formation. (See text of the paper for precise definition.) Weighted averages are computed using commitment size. NA (i.e. North America) includes US and Canada. Excess PMEs are winsorized at the 0.5th and 99.5th percentiles. One vehicle may have more than one LP.

LP region	Vehicle type	N	Weighted Average	p-Value	Average	p-Value	Median
NA	Discretionary	587	-0.041	0.397	0.012	0.781	0.013
NA	GP-Directed	523	-0.041	0.056	0.009	0.747	0.005
Europe	Discretionary	78	0.177	0.000	0.218	0.013	0.159
Europe	GP-Directed	139	-0.023	0.588	0.063	0.383	0.000
RoW	Discretionary	104	0.081	0.095	-0.010	0.854	-0.086
RoW	GP-Directed	115	-0.205	0.002	-0.183	0.005	-0.050

Table 10: Analysis of Alternative Vehicle Performance by GP and LP Characteristics. Each investment by an individual LP in an alternative vehicle is an observation; the dependent variable is its adjusted excess PME performance. Weighted regressions use the individual capital commitments as weights. GP and LP prior five-year mean PME are averages, weighted by commitments, over the prior five years. The reference categories are Fund-of-Funds for LP type, North America (US & Canada) for LP Region, and bottom tercile for LP Size. T is a time trend variable equal to vintage year less 1980. Standard errors are clustered by GP and LP and shown in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% level, respectively. Excess PMEs are winsorized at the 0.5th and 99.5th percentiles.

	All alternative vehicles				**Discretionary**	**GP-Directed**
Variables	**Unweighted**	**Weighted**	**Unweighted**	**Weighted**	**Weighted**	**Weighted**
$Vehicle\_type_{discretionary}$	0.195	-0.137	0.179	-0.194		
	(0.136)	(0.351)	(0.161)	(0.370)		
$LP\_type_{foundation\ \&\ endowment}$	0.230	0.261	0.244	0.341	-0.269	0.174
	(0.084)***	(0.151)*	(0.112)**	(0.173)**	(0.446)	(0.121)
$LP\_type_{insurance\ \&\ financial\ institution}$	0.223	0.308	0.215	0.198	-0.490	0.219
	(0.057)***	(0.091)***	(0.094)**	(0.174)	(0.406)	(0.111)**
$LP\_type_{private\ pension}$	0.218	0.309	0.229	0.336	-0.202	0.256
	(0.088)**	(0.112)***	(0.116)**	(0.119)***	(0.483)	(0.066)***
$LP\_type_{public\ pension}$	0.189	-0.097	0.172	0.032	-0.528	0.186
	(0.105)*	(0.267)	(0.096)*	(0.180)	(0.446)	(0.177)
$LP\_type_{soverign\ wealth\ fund}$	-0.196	0.033	-0.145	0.129	-1.943	-0.070
	(0.186)	(0.149)	(0.176)	(0.215)	(1.273)	(0.164)
LP_region_{Europe}	0.191	0.247	0.176	0.096	0.013	0.100
	(0.129)	(0.162)	(0.113)	(0.140)	(0.256)	(0.104)
LP_region_{RoW}	-0.017	-0.059	-0.049	-0.102	1.138	0.133
	(0.183)	(0.173)	(0.208)	(0.221)	(1.128)	(0.163)
LP_size_{middle}	0.044	0.351	0.011	-0.030	-1.664	-0.018
	(0.145)	(0.219)	(0.140)	(0.227)	(0.920)*	(0.120)
LP_size_{top}	0.076	0.430	0.048	0.007	-0.812	0.086
	(0.113)	(0.213)**	(0.127)	(0.250)	(0.643)	(0.098)
$LP\_prior\_5yr\_PME$			0.127	1.849	4.679	0.212
			(0.088)	(0.877)**	(1.632)***	(0.086)**
GP_region_{Europe}	0.301	0.637	0.328	0.610	1.194	0.229
	(0.109)***	(0.301)**	(0.114)***	(0.257)**	(0.385)***	(0.113)**
GP_region_{RoW}	1.814	0.802	1.951	0.907	0.077	1.755
	(1.362)	(0.720)	(1.480)	(0.755)	(0.441)	(1.460)
GP_size_{Middle}	0.101	-0.226	-0.074	-0.424	-1.876	-0.193
	(0.236)	(0.208)	(0.267)	(0.304)	(0.701)***	(0.257)
GP_size_{Top}	0.179	-0.076	0.116	-0.229	-2.026	0.139
	(0.232)	(0.175)	(0.300)	(0.335)	(0.769)***	(0.162)
$GP\_strategy_{VC}$	0.438	0.378	0.442	0.482	0.428	0.470
	(0.325)	(0.276)	(0.304)	(0.272)*	(0.318)	(0.327)
$GP\_strategy_{Debt}$	-0.037	0.267	-0.050	0.316	0.737	0.007

	(0.209)	(0.241)	(0.204)	(0.228)	(0.434)*	(0.106)
$GP\_prior\_5yr\_PME$			-0.217	-0.081	0.080	-0.435
			(0.329)	(0.355)	(1.207)	(0.179)**
T	0.072	0.253	0.069	0.275	0.784	-0.077
	(0.064)	(0.204)	(0.084)	(0.217)	(0.293)***	(0.105)
Observations	3615	3615	3364	3364	1468	1896
Adjusted R-squared	0.062	0.043	0.068	0.090	0.222	0.091

Table 11: LP and GP Matching in Alternative Vehicles. Each investment by an individual LP in an alternative vehicle is an observation; the performance variables are the vehicle's PME, its adjusted excess PME, and its PME less the weighted average PME of main funds that it has invested over the same time period. We characterize the match between the LP and the GP as follows: (1) LP and GP above median, (2) LP and GP below median, (3) LP above median and GP above, and (4) *vice versa*. Weighted averages are computed using commitment size. PMEs are winsorized at the 99th percentile in Panel A and at the 0.5^{th} and 99.5^{th} percentiles in Panels B and C.

Panel A: Alternative vehicle PME.

	LP+GP+	LP+GP-	LP-GP+	LP-GP-
All	1.12	0.93	0.94	0.76
Discretionary	1.19	0.89	0.91	0.68
GP-Directed	1.05	0.95	0.96	0.80

Panel B: Alternative vehicle adjusted excess PME.

	LP+GP+	LP+GP-	LP-GP+	LP-GP-
All	0.08	0.11	-0.23	-0.11
Discretionary	0.26	0.03	-0.28	-0.12
GP-Directed	-0.08	0.16	-0.20	-0.10

Panel C: Alternative vehicle PME less the weighted average PME of main funds that it has invested in during the prior five years.

	LP+GP+	LP+GP-	LP-GP+	LP-GP-
All	0.10	-0.11	0.10	-0.03
Discretionary	0.22	-0.16	0.12	-0.06
GP-Directed	-0.01	-0.09	0.10	-0.02

Table 12: Analysis of LP and GP Matching in Alternative Vehicles. Each investment by an individual LP in an alternative vehicle is an observation; the dependent variable is its PME performance. The reference categories are buyout for GP strategy and bottom tercile for GP size. In Columns 1, 3, and 5, we use the average performance over the total PE portfolio and the entire period an LP or GP is in our sample. We then classify LPs and GPs into above-median versus below-median performers. We form four dummies to characterize the match between the LP and the GP as follows: (1) LP and GP above median, (2) LP and GP below median, (3) LP above median and GP above, and (4) *vice versa*. In the even columns, we repeat the same regression set–up, but use as the performance measure the average weighted PME in the five years prior to the inception of the alternative vehicle. (We use the individual capital commitments as weights.) Standard errors are shown in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% level, respectively. PMEs are winsorized at the 99th percentile.

Variables	**All alternative vehicles**		**Discretionary**		**GP-Directed**	
GP_size_{Middle}	0.229		-0.069		0.424	
	(0.312)		(0.649)		(0.294)	
GP_size_{Top}	0.149		-0.309		0.437	
	(0.306)		(0.637)		(0.288)	
$GP\_strategy_{VC}$	0.025		-0.053		0.116	
	(0.043)		(0.080)		(0.044)***	
$GP\_strategy_{Debt}$	0.002		0.167		-0.100	
	(0.033)		(0.061)***		(0.034)***	
$LP\_PME(+)GP\_PME(-)$	0.181	0.023	0.246	-0.004	0.174	0.042
	(0.039)***	(0.023)	(0.083)***	(0.043)	(0.037)***	(0.025)*
$LP\_PME(-)GP\_PME(+)$	0.185	0.122	0.274	0.244	0.162	0.066
	(0.034)***	(0.026)***	(0.073)***	(0.054)***	(0.032)***	(0.026)**
$LP\_PME(+)GP\_PME(+)$	0.376	0.265	0.588	0.399	0.263	0.200
	(0.034)***	(0.024)***	(0.072)***	(0.048)***	(0.033)***	(0.025)***
Observations	3615	3364	1544	1468	2071	1896
Adjusted R-squared	0.041	0.038	0.064	0.054	0.036	0.034

Appendix A: Variable Definitions

Variables	Definition
GP_strategy_{xxx}	Dummy variable for GP main strategy: Venture Capital, Debt Related, Buy out
GP_size_{xxx}	Dummy variable for GP size tercile: Bottom, Middle and Top.
GP_prior_5yr_PME	weighted average of the GP's prior 5-year PME
$GP\_fixed\_effects$	Dummy variable for individual GP
type_{xxx}	Dummy for LP types: Funds-of-Funds (reference group): Foundations and Endowments, Insurance and Financial Institutions, Private Pension, Public Pension, Sovereign Wealth Funds
LP_region_{xxx}	Dummy for LP region: US (reference group), Europe and RoW
LP_size_{xxx}	Dummy for LP size tercile: Bottom (reference group), Middle and Top
$LP\_prior\_5yr\_PME$	weighted average of the LP's prior 5-year PME
$LP\_prior\_5yr\_PME \times GP\_prior\_5yr\_PME$	Interaction between weighted average of the LP's prior 5-year PME and weighted average of the GP's prior 5-year PME
T (five-year series)	Time trend variable indicating the five-year period of the dependent variable. We start with 0 for 1980-1984, 1 for 1985-1989 and so on.
T (Vintage year – 1980)	Time trend variable defined as the vintage year of the alternative vehicle minus 1980
$\text{T} \times \text{GP\_region}_{xxx}$	Interaction between GP region and time trend variable
$\text{T} \times \text{GP\_strategy}_{xxx}$	Interaction between GP strategy and time trend variable
$\text{T} \times \text{GP\_size}_{xxx}$	Interaction between GP size tercile and time trend variable
$\text{T} \times \text{Vehicle\_type}_{xxx}$	Interaction between vehicle type and time trend variable
$\text{Vehicle\_type}_{xxx}$	Dummy for vehicle type: Discretionary or GP-directed (reference group)
$LP\_PME(+)GP\_PME(+)$	Dummy for LP performance above median and GP performance above median

Appendix B: Replicating the main fund performance calculations of Harris, et al. (2016). PME calculations use the S&P 500, North American GPs only, and just buyout and venture capital main funds (but are computed through mid-2017).

	Buyout				Venture Capital			
Vintage year	N	Median	Mean	Weighted average	N	Median	Mean	Weighted average
1985	1	0.93	0.93	0.93				
1986					1	1.58	1.58	1.58
1987	1	0.98	0.98	0.98				
1988	7	1.01	1.22	1.00	8	1.28	1.12	1.35
1989	3	1.17	1.29	1.69	8	1.12	1.24	1.20
1990	6	0.93	0.88	0.87	7	1.14	1.55	1.79
1991	6	1.09	1.15	1.22	5	0.88	0.72	0.61
1992	8	1.24	1.21	1.13	9	1.15	1.65	1.48
1993	10	1.07	1.36	1.13	13	1.13	1.33	1.46
1994	17	1.07	1.20	1.49	16	1.47	2.36	1.37
1995	13	0.98	1.22	1.17	9	1.68	2.05	2.69
1996	19	1.28	1.33	1.35	12	1.52	2.35	1.49
1997	37	1.44	1.46	1.39	21	1.27	1.69	1.13
1998	52	1.33	1.43	1.39	30	1.28	2.20	1.08
1999	45	1.39	1.26	1.22	56	0.67	0.77	0.61
2000	49	1.32	1.48	1.48	74	0.76	0.98	0.84
2001	47	1.46	1.44	1.59	36	0.92	0.96	0.92
2002	40	1.37	1.45	1.35	21	0.65	0.73	0.70
2003	42	1.36	1.53	1.54	15	0.81	3.03	0.87
2004	58	1.30	1.26	1.40	29	0.78	1.47	0.95
2005	84	1.02	1.06	1.10	52	0.87	1.24	1.18
2006	96	0.98	1.17	0.98	67	0.86	1.08	0.97
2007	116	0.98	1.23	1.02	63	0.92	1.02	0.97
2008	101	0.91	0.92	0.90	52	0.87	1.07	1.02
2009	41	0.96	1.02	0.99	30	1.05	1.11	1.03
2010	45	1.00	0.94	0.75	35	1.11	1.17	1.21
Average	944	1.14	1.22	1.20	669	1.07	1.44	1.19
Average 2000s	719	1.15	1.23	1.19	474	0.87	1.26	0.97
Average 1990s	213	1.18	1.25	1.24	178	1.22	1.67	1.37
Average 1980s	12	1.02	1.11	1.15	17	1.33	1.31	1.38

Appendix C: Tables 2, 3, and F-1, without private debt GPs.

Table 2 without private debt GPs

Russell 3000 KS PME

Vehicle type	N	25%	50%	75%	Weighted Average PME
MAIN	3126	1.25	0.97	0.76	1.03
Main AV-Associated	605	1.25	0.99	0.77	1.02
DISCRETIONARY	768	1.24	0.99	0.76	0.99
GP-DIRECTED	706	1.28	1.01	0.82	0.98

IRR

Vehicle type	N	25%	50%	75%	Weighted Average IRR
MAIN	3126	0.18	0.09	0.00	0.09
Main AV-Associated	605	0.17	0.09	-0.01	0.10
DISCRETIONARY	768	0.25	0.10	-0.02	0.08
GP-DIRECTED	706	0.24	0.12	0.03	0.11

TVPI

Vehicle type	N	25%	50%	75%	Weighted Average TVPI
MAIN	3126	1.74	1.29	0.99	1.38
Main AV-Associated	605	1.68	1.25	0.99	1.37
DISCRETIONARY	768	1.56	1.15	0.94	1.27
GP-DIRECTED	706	1.75	1.32	1.05	1.26

Table 3 without private debt GPs

Vehicle type	N	Weighted average	p-value	Average	p-value	median
All	1306	-0.080	0.000	-0.014	0.538	0.002
Discretionary	674	-0.049	0.197	-0.014	0.709	0.002
GP-Directed	632	-0.100	0.000	-0.014	0.560	0.001

Table F-1 without private debt GPs

Vehicle type	N	Weighted average	p-value	Average	p-value	median
All	1306	-0.090	0.000	-0.015	0.522	0.002
Discretionary	674	-0.051	0.170	-0.010	0.789	0.001
GP-Directed	632	-0.115	0.000	-0.020	0.424	0.002

Appendix D: Tables 2, 3, and F-1, with vintage years before 2012.

Table 2 with vintage years before 2012

Russell 3000 KS PME

Vehicle type	N	25%	50%	75%	Weighted Average PME
MAIN	2447	1.33	0.99	0.72	1.05
Main AV-Associated	430	1.35	0.98	0.71	1.03
DISCRETIONARY	498	1.29	1.00	0.65	0.92
GP-DIRECTED	501	1.35	1.02	0.76	1.03

IRR

Vehicle type	N	25%	50%	75%	Weighted Average IRR
MAIN	2447	0.18	0.09	0.02	0.10
Main AV-Associated	430	0.16	0.08	-0.01	0.10
DISCRETIONARY	498	0.27	0.09	-0.02	0.04
GP-DIRECTED	501	0.23	0.12	0.02	0.12

TVPI

Vehicle type	N	25%	50%	75%	Weighted Average TVPI
MAIN	2447	1.91	1.44	1.05	1.50
Main AV-Associated	430	1.87	1.36	0.98	1.48
DISCRETIONARY	498	1.78	1.20	0.88	1.32
GP-DIRECTED	501	1.93	1.48	1.10	1.50

Table 3 with vintage years before 2012

Vehicle type	N	Weighted average	p-value	Average	p-value	median
All	953	-0.149	0.000	-0.037	0.189	0.000
Discretionary	461	-0.276	0.000	-0.089	0.080	-0.022
GP-Directed	492	-0.077	0.002	0.012	0.670	0.003

Table F-1 with vintage years before 2012

Vehicle type	N	Weighted average	p-value	Average	p-value	median
All	953	-0.166	0.000	-0.040	0.149	0.000
Discretionary	461	-0.287	0.000	-0.087	0.082	-0.025
GP-Directed	492	-0.099	0.000	0.003	0.910	0.003

Appendix E: Tables 2, 3, and F-1, without blocker and off-shore funds.

Table 2 without blocker and off-shore funds

Russell 3000 KS PME

Vehicle type	N	25%	50%	75%	Weighted Average PME
MAIN	3556	1.23	0.97	0.77	1.02
Main AV-Associated	642	1.20	0.97	0.75	1.02
DISCRETIONARY	829	1.22	0.99	0.77	0.99
GP-DIRECTED	688	1.26	1.01	0.80	0.97

IRR

Vehicle type	N	25%	50%	75%	Weighted Average IRR
MAIN	3556	0.17	0.09	0.00	0.09
Main AV-Associated	642	0.17	0.09	-0.01	0.10
DISCRETIONARY	829	0.24	0.09	-0.01	0.09
GP-DIRECTED	688	0.24	0.12	0.03	0.11

TVPI

Vehicle type	N	25%	50%	75%	Weighted Average TVPI
MAIN	3556	1.70	1.28	1.00	1.37
Main AV-Associated	642	1.65	1.22	0.99	1.37
DISCRETIONARY	829	1.55	1.16	0.95	1.26
GP-DIRECTED	688	1.73	1.30	1.04	1.26

Table 3 without blocker and off-shore funds

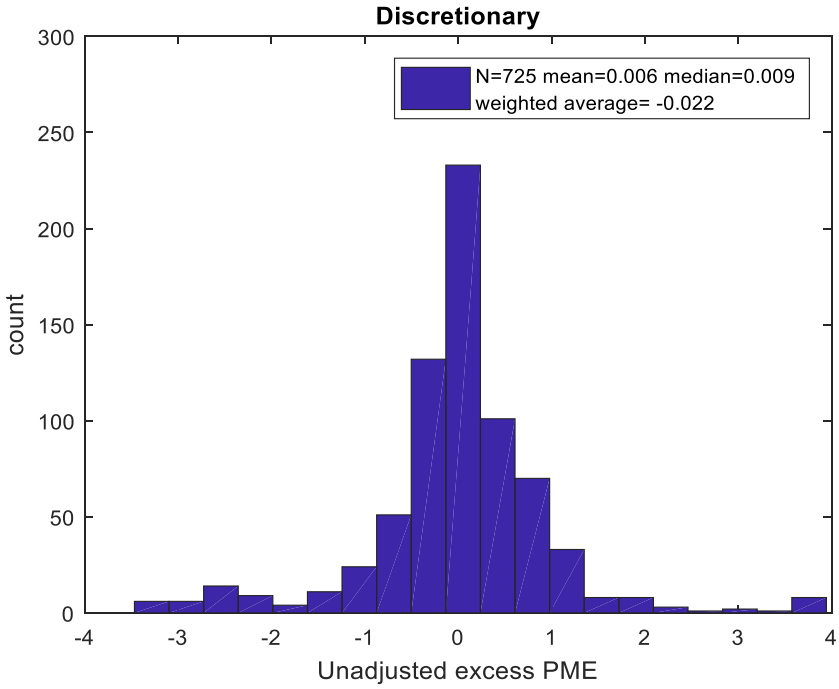
Vehicle type	N	Weighted average	p-value	Average	p-value	median
All	1323	-0.076	0.001	-0.005	0.825	0.004
Discretionary	714	-0.027	0.476	0.003	0.936	0.010
GP-Directed	609	-0.116	0.000	-0.015	0.562	0.004

Table F-1 without blocker and off-shore funds

Vehicle type	N	Weighted average	p-value	Average	p-value	median
All	1323	-0.090	0.000	-0.008	0.742	0.004
Discretionary	714	-0.037	0.327	0.004	0.924	0.008
GP-Directed	609	-0.132	0.000	-0.021	0.422	0.004

Appendix F: Additional Figure and Tables

Figure F-1: Unadjusted Excess Performance of Alternative Vehicles, by Vehicle Type. Excess PMEs are winsorized at the 0.5th and 99.5th percentiles.
Panel A. Histogram of unadjusted excess PME performance of discretionary vehicles.



Panel B. Histogram of unadjusted excess PME performance of GP-directed vehicles.

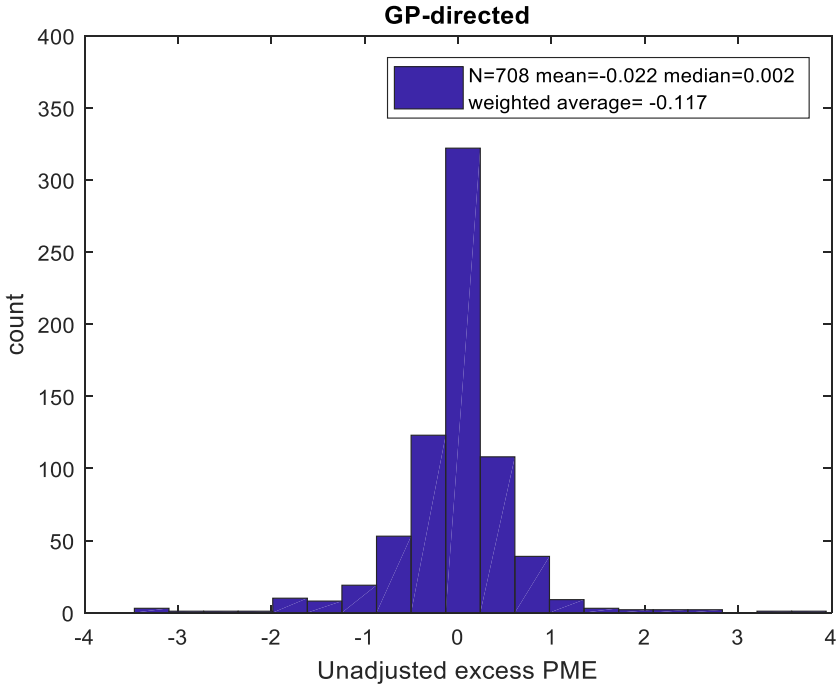


Table F-1: Unadjusted Excess PME Performance of Alternative Vehicles. The performance metric used is the Kaplan-Schoar Public Market Equivalent versus the Russell 3000. The performance of each alternative vehicle is compared to that of the most recent main fund raised by the same group of the same type within the past five years. (See text of the paper for precise definition.) Weighted averages are computed using commitment size. Excess PMEs are winsorized at the 0.5th and 99.5th percentiles.

Vehicle type	N	Weighted average	p-value	Average	p-value	median
All	1433	-0.079	0.000	-0.008	0.715	0.003
Discretionary	725	-0.022	0.521	0.006	0.869	0.009
GP-Directed	708	-0.117	0.000	-0.022	0.343	0.002

Table F-2: Excess Performance of Alternative Vehicles, by Decade of Vehicle Formation. The performance metric used is the Kaplan-Schoar Public Market Equivalent versus the Russell 3000. The performance of each alternative vehicle is compared to that of the most recent main fund raised by the same group of the same type within the past five years, with and without an adjustment for the mean PME for main funds in the vintage of the vehicles' formation. (See text of the paper for precise definition.) Weighted averages are computed using commitment size. Excess PMEs are winsorized at the 0.5th and 99.5th percentiles.
Panel A. Unadjusted excess PME performance.

Vehicle type	Decade	N	Weighted average	p-value	Average	p-value	median
All	1990s	105	-0.018	0.848	-0.567	0.000	-0.055
All	2000s	636	-0.222	0.000	0.022	0.470	0.001
All	2010s	692	-0.024	0.298	0.049	0.054	0.006
Discretionary	1990s	71	-0.071	0.624	-0.879	0.000	-0.405
Discretionary	2000s	288	-0.429	0.000	0.047	0.394	-0.060
Discretionary	2010s	366	0.146	0.000	0.146	0.000	0.036
GP-Directed	1990s	34	0.032	0.777	0.087	0.605	0.007
GP-Directed	2000s	348	-0.071	0.030	0.001	0.965	0.007
GP-Directed	2010s	326	-0.138	0.000	-0.058	0.076	0.000

Panel B. Adjusted excess PME performance.

Vehicle type	Decade	N	Weighted average	p-value	Average	p-value	median
All	1990s	105	0.010	0.918	-0.564	0.000	-0.007
All	2000s	636	-0.206	0.000	0.022	0.475	0.000
All	2010s	692	-0.014	0.558	0.054	0.038	0.009
Discretionary	1990s	71	-0.049	0.750	-0.900	0.000	-0.405
Discretionary	2000s	288	-0.419	0.000	0.047	0.395	-0.042
Discretionary	2010s	366	0.151	0.000	0.146	0.000	0.046
GP-Directed	1990s	34	0.066	0.549	0.139	0.366	0.087
GP-Directed	2000s	348	-0.049	0.127	0.001	0.977	0.005
GP-Directed	2010s	326	-0.124	0.000	-0.049	0.138	0.000

Table F-3: Characteristics of GPs and LPs.

GPs	Count	Average	Median	Standard Deviation	10%	90%
1st activity year	870	2003.4	2005	7.96	2014	1993
Commitment (USD MM)	870	$611	$134	$2,065	$1,213	$ 15

LPs	Count	Average	Median	Standard Deviation	10%	90%
1st activity year	112	1998.36	1999	9.32	2010	1983
Commitment (USD MM)	112	$4,749	$775	$11,308	$12,106	$43

Table F-4: Breakdown of Vehicle Count by GP Strategy.

Vehicle type	Buyout	Private Debt	Venture Capital	Grand Total
Main	2008 (37.7%)	443 (8.3%)	1169 (22.0%)	3620 (68.0%)
Discretionary	671 (12.6%)	73 (1.4%)	139 (2.6%)	883 (16.6%)
GP-Directed	564 (10.6%)	98 (1.8%)	157 (3.0%)	819 (15.4%)
Grand Total	3243 (60.9%)	614 (11.5%)	1465 (27.5%)	5322 (100.0%)

Table F-5: Breakdown of Vehicle Formation by GP Size. GPs are divided into terciles by the amount of capital they raised between 1980 and 2017. The top tercile has largest GP size.
Panel A. Vehicle counts by GP size tercile.

	GP size tercile			
Vehicle type	Bottom	Middle	Top	Grand Total
Main	456 (8.6%)	902 (16.9%)	2262 (42.5%)	3620 (68.0%)
Discretionary	17 (0.3%)	64 (1.2%)	802 (15.1%)	883 (16.6%)
GP-Directed	14 (0.3%)	124 (2.3%)	681 (12.8%)	819 (15.4%)
Grand Total	487 (9.2%)	1090 (20.5%)	3745 (70.4%)	5322 (100.0%)

Panel B. Commitment (USD Millions) amount by GP size tercile.

	GP size tercile			
Vehicle type	Bottom	Middle	Top	Grand Total
Main	$8,074 (1.5%)	$37,437 (7.0%)	$398,679 (75.0%)	$444,190 (83.5%)
Discretionary	$43 (0.01%)	$709 (0.1%)	$37,122 (7.0%)	$37,874 (7.1%)
GP-Directed	$92 (0.02%)	$1,380 (0.3%)	$48,376 (9.1%)	$49,848 (9.4%)
Grand Total	$8,209 (1.5%)	$39,526 (7.4%)	$484,177 (91.01%)	$531,912 (100.0%)

Table F-6: Breakdown of Vehicle Count by GP Geography.

Vehicle type	Europe	NA	RoW	Grand Total
Main	541 (10.2%)	2858 (53.7%)	221 (4.2%)	3620 (68.0%)
Discretionary	89 (1.7%)	778 (14.6%)	16 (0.3%)	883 (16.6%)
GP-Directed	156 (2.9%)	621 (11.7%)	42 (0.8%)	819 (15.4%)
Grand Total	786 (14.8%)	4257 (80.0%)	279 (5.2%)	5322 (100.0%)

Table F-7: Breakdown of Investment Count by LP Type. Note one vehicle may have multiple LPs.

	Vehicle type			
LP type	Main	Discretionary	GP-Directed	Grand Total
Fund-of-Funds	1730 (8.8%)	63 (0.3%)	168 (0.9%)	1961 (9.9%)
Foundation & Endowment	1424 (7.2%)	119 (0.6%)	123 (0.6%)	1666 (8.4%)
Insurance & Financial institution	6280 (31.8%)	808 (4.1%)	1535 (7.8%)	8623 (43.6%)
Private Pension	717 (3.6%)	43 (0.3%)	73 (0.4%)	833 (4.2%)
Public Pension	4576 (23.2%)	640 (3.2%)	387 (2.0%)	5603 (28.3%)
Sovereign Wealth Fund	826 (4.2%)	127 (0.6%)	125 (0.6%)	1078 (5.5%)
Grand Total	15553 (78.7%)	1800 (9.1%)	2411 (12.2%)	19764 (100.0%)

Table F-8: Breakdown of Vehicle Formation by LP Size. Note one vehicle may have multiple LPs.
Panel A. Investment counts by vehicle structure and LP commitment size tercile.

	LP commitment size tercile			
Vehicle type	Bottom	Middle	Top	Grand Total
Main	355 (1.8%)	1737 (8.8%)	13461 (68.1%)	15553 (78.7%)
Discretionary	14 (0.1%)	113 (0.6%)	1673 (8.5%)	1800 (9.1%)
GP-Directed	41 (0.2%)	219 (1.1%)	2151 (10.9%)	2411 (12.2%)
Grand Total	410 (2.1%)	2069 (10.5%)	17285 (87.5%)	19764 (100.0%)

Panel B. Commitment (USD Millions) amount by LP commitment size tercile and vehicle structure.

	LP commitment size tercile			
Vehicle type	Bottom	Middle	Top	Grand Total
Main	$2,605 (0.5%)	$22,451 (4.2%)	$419,135 (78.8%)	$444,191 (83.5%)
Discretionary	$341 (0.1%)	$3,232 (0.6%)	$34,301 (6.4%)	$37,874 (7.1%)
GP-Directed	$579 (0.1%)	$3,850 (0.7%)	$45,419 (8.5%)	$49,848 (9.4%)
Grand Total	$3,525 (0.7%)	$29,533 (5.6%)	$498,855 (93.8%)	$531,913 (100.0%)

Table F-9: Breakdown of Investment Counts by LP Geography. Note one vehicle may have multiple LPs.

	Region			
Vehicle type	Europe	NA	RoW	Grand Total
Main	2150 (10.9%)	12303 (62.2%)	1100 (5.6%)	15553 (78.7%)
Discretionary	182 (0.9%)	1487 (7.5%)	131 (0.7%)	1800 (9.1%)
GP-Directed	296 (1.5%)	1963 (9.9%)	152 (0.8%)	2411 (12.2%)
Grand Total	2628 (13.3%)	15753 (79.7%)	1383 (7.0%)	19764 (100.0%)

Table F-10: Adjusted Excess Performance of Alternative Vehicles by LP Size. The performance metric used is the Kaplan-Schoar Public Market Equivalent versus the Russell 3000. The performance of each alternative vehicle is compared to that of the most recent main fund raised by the same group of the same type within the past five years, with an adjustment for the mean PME for main funds in the vintage of the vehicles' formation. (See text of the paper for precise definition.) Weighted averages are computed using commitment size. Excess PMEs are winsorized at the 0.5^{th} and 99.5^{th} percentiles. One vehicle may have more than one LP.

LP size	Vehicle type	N	Weighted Average	p-Value	Average	p-Value	Median
Bottom	Discretionary	10	-0.310	0.010	0.087	0.689	0.099
Bottom	GP-Directed	35	-0.005	0.945	-0.102	0.177	-0.015
Middle	Discretionary	78	0.090	0.112	-0.050	0.630	-0.087
Middle	GP-Directed	152	-0.080	0.067	-0.020	0.755	-0.001
Top	Discretionary	665	0.011	0.781	0.039	0.310	0.029
Top	GP-Directed	585	-0.094	0.000	-0.001	0.981	0.004

Table F-11: Analysis of LP and GP Matching in Alternative Vehicles. Each investment by an individual LP in an alternative vehicle is an observation; the dependent variable is its PME performance. The reference categories are buyout for GP strategy and bottom tercile for GP size. In Columns 1, 3, and 5, we use the average performance over the total PE portfolio and the entire period an LP or GP is in our sample. We then classify LPs and GPs into above-median versus below-median performers. We form four dummies to characterize the match between the LP and the GP as follows: (1) LP and GP above median, (2) LP and GP below median, (3) LP above median and GP above, and (4) *vice versa*. In the even columns, we repeat the same regression set–up, but use as the performance measure the average weighted PME in the five years prior to the inception of the alternative vehicle. (We use the individual capital commitments as weights.) The dummy *HasPriorRelationship* indicates if the LP had invested in any of the GP's main funds before investing in the alternative vehicle with the GP. Standard errors are shown in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% level, respectively. PMEs are winsorized at the 99th percentile.

Variables	**All alternative vehicles**		**Discretionary**		**GP-Directed**	
GP_size_{Middle}	0.196	0.197	-0.057	-0.231	0.387	0.383
	(0.285)	(0.329)	(0.584)	(0.686)	(0.278)	(0.320)
GP_size_{Top}	0.138	0.140	-0.228	-0.305	0.397	0.357
	(0.280)	(0.323)	(0.574)	(0.674)	(0.272)	(0.313)
$GP\_strategy_{VC}$	0.007	-0.075	-0.038	-0.229	0.077	0.030
	(0.039)	(0.041)*	(0.072)	(0.073)***	(0.041)*	(0.044)
$GP\_strategy_{Debt}$	-0.004	-0.005	0.147	0.071	-0.103	-0.083
	(0.030)	(0.031)	(0.055)***	(0.055)	(0.032)***	(0.033)**
$HasPriorRelationshp$	-0.097	-0.056	-0.186	-0.065	-0.060	-0.047
	(0.019)***	(0.020)***	(0.042)***	(0.043)	(0.018)***	(0.019)**
$LP\_PME(+)GP\_PME(-)$	0.186	0.020	0.284	0.003	0.166	0.038
	(0.036)***	(0.024)	(0.075)***	(0.043)	(0.035)***	(0.025)
$LP\_PME(-)GP\_PME(+)$	0.218	0.118	0.376	0.245	0.174	0.065
	(0.032)***	(0.027)***	(0.069)***	(0.056)***	(0.031)***	(0.026)**
$LP\_PME(+)GP\_PME(+)$	0.387	0.264	0.632	0.412	0.269	0.197
	(0.032)***	(0.024)***	(0.066)***	(0.049)***	(0.031)***	(0.025)***
Observations	3615	3364	1544	1468	2071	1896
Adjusted R-squared	0.051	0.040	0.081	0.061	0.042	0.039