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Private Equity and Venture Capital Fund Performance: Evidence from a Large Sample of Israeli Limited Partners

Finance Working Paper N° 930/2023
August 2023

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We would like to thank conference participants at the 2022 conference of the European Financial Management Association (Rome), the 2022 HEC Paris Entrepreneurship Workshop, the 2023 Private Equity Research Consortium (Oxford), the 34th Mitsui Finance Symposium (University of Michigan), and the 6th Private Markets Research Conference (Lausanne), as well as seminar participants at Ben Gurion University, for their helpful comments. We are especially grateful to Aleksander Andonov, David Robinson and to our conference discussants, Sara Ain Tommar, Minmo Ghang, and Johan Cassel Pegelow for their thoughtful comments and suggestions.

Abstract

We assemble cash flow data on all investments by Israeli pension providers in private equity and venture capital funds over nearly 20 years to evaluate their realized performance which has been mostly unavailable for non-US-based funds and limited partners. We obtain three main results: (i) The performance experienced by Israeli LPs has been slightly below the performance derived from the US-based literature and data sources. This finding appears to be driven by both limited access to top performing, seasoned, US funds, as well as by limited skill in selecting first-time US funds; (ii) Investments in local Israeli funds have outperformed investments in foreign funds, which we attribute to both superior access to, and superior selection skills of, local funds; (iii) We compare our data and results to those based on Preqin, one of the most commonly used commercial data bases, and find that it tends to omit small funds as well as funds with poor performance, both within and outside the US. While Preqin may provide reliable estimates of industry-wide performance, it may not always reflect the actual returns realized by non-US based limited partners.

Keywords: Institutional Investors, Limited Partners, Private Equity, Venture Capital

JEL Classifications: G20, G23, G24

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1. Introduction

Pension funds and institutional investors around the world have been allocating an increasing fraction of their assets under management to private equity (PE), venture capital (VC), and other types of private funds.[1] Public pension funds tracked by Preqin, for example, have steadily increased their allocations to this asset class over the past decade, with the median allocation rising from 18.1% in 2010 to 30.3% in 2020, and 79% of investors stating that they expect to allocate a larger proportion of their funds to private equity by 2025 (Lee (2020)).

While allocations to private funds have been steadily increasing there is limited systematic evidence on the performance of non-US based institutional investors, the limited partners (LPs) of these funds. The performance of non-US LPs may differ from what has been documented for US LPs for various reasons, such as differences in access to top performing funds (Sensoy et al. (2014)),

[1] See, for example, Lerner et al. (2008), Ivashina and Lerner (2018), and Binfare et al. (2023).

differences in skill or ability to select successful PE or VC fund general partners (GPs) (Cavagnaro et al. (2019)), and differences in fees (Begenau and Siriwardane (2022)).[2]

In this paper we utilize a newly assembled and highly detailed data set on all capital calls and distributions associated with investments in PE, VC, and other types of private funds by the eight largest institutional investors in Israel. Much like their peers elsewhere, institutional investors in Israel, including pension funds, life insurance plans, and other forms of long-term savings known as provident funds, have increased their allocations to illiquid assets from 12% of assets under management (AUM) in 2010 to 17% in 2020. Their investments in PE , VC, and other types of private funds have increased from a mere 1% of their AUM in 2010 to 5% in 2020. This increase in the allocation of funds to PE and other funds coincided with a dramatic increase of 250% in the total value of AUM during this time period, driven by the introduction of mandatory retirement savings. As a result, the volume of investment by Israeli LPs in PE and other types of private funds has become economically large in absolute, not only relative, terms.

The eight LPs whose investment performance is at the core of this study are the largest institutional investors in Israel, managing 76% of all retirement savings. Their cash flow data constitutes part of the information that the institutions managing retirement savings are mandated to report to the Capital Market, Insurance, and Savings Authority at the Ministry of Finance. The data set is therefore free of survivorship and other biases documented in the literature in the context of some commercial data sources on PE and VC fund performance. Furthermore, in contrast with the limited availability of data on cash flows associated with non-US-based LPs in commonly used commercial data providers, our detailed cash flow data enable the calculation of performance measures such as the Public Market Equivalent (PME) relative to several traded benchmarks, whereas the existing literature has relied primarily on theoretically inferior measures such as IRR or cash multiples.

The performance of Israeli pension funds is interesting primarily because it is likely to be indicative of the performance of non-US based institutional investors elsewhere. The pension system in Israel is

[2]Earlier work by Lerner et al. (2007) documents a large heterogeneity in the performance of different classes of LPs and Da Rin and Phalippou (2017) show that LPs vary significantly in the practices they employ when investing in PE and related assets.

comprehensive, where every employee and employer must deposit a fixed fraction of the employee's income each month. These long-term savings are managed by for-profit, non-bank institutions, primarily insurance companies and other non-bank investment managers. In many ways, this pension system resembles the retirement savings plans of many developed (OECD) countries.[3] In addition to its structure, the Israeli pension system is interesting because of its rapid growth. The main consequence of the introduction of a mandatory retirement saving system in Israel has been an increase in AUM of close to 10% p.a. over the past decade, reaching a total AUM of about 2.3 trillion ILS (about 700 billion USD) as of the end of 2019. The Israeli pension system may offer lessons for similarly structured, fast growing, retirement savings systems in other countries.

Although not the main focus of the present study, the performance of Israeli LPs in their VC (as distinct from PE) investments may be of interest for another reason. According to the OECD (2016), the ratio of VC investments to GDP in Israel is the highest in the world and Israel's reputation as the "start-up nation" makes the documentation of returns to investment in the Israeli VC industry particularly interesting. While there is an extensive literature on the growth of the high-tech sector in Israel, there is no systematic evidence that we are aware of on the financial returns realized by local LPs. The data used in this study suggest that the average and median return has not been high in comparison with relevant traded equity benchmarks, indicating that the rents from investment in technological startups have been captured by other entities (e.g., the entrepreneurs or certain VC funds).

The analysis in this study is based on cash flows and net asset values (NAVs) for about 1,400 investments in PE and VC funds of various types including buyout, venture capital, real estate, infrastructure and debt funds, for a 20-year period ending in December 2019. Using this information, we provide comprehensive evidence on the net-of-fees return realized by Israeli LPs and thus contribute to the extensive literature on the performance of PE and VC investments. This literature finds that PE funds have outperformed public markets in the 1990s and early 2000, although recent evidence is more nuanced. With respect to VC funds, there appears to be considerable variation both across time periods and funds (see, for example, Kaplan and Schoar (2005), Harris

[3]Banks are not allowed to operate in the long-term savings market following a 2006 reform.

et al. (2014), Brown and Kaplan (2019), Korteweg et al. (2022)). Importantly, existing evidence is based nearly exclusively on the experience of US-based LPs investing in US-based funds, while evidence on the performance of LPs and funds outside the US is rare.

Our first finding is that PE performance in our data set is slightly lower than what has been documented for US LPs in the literature. It is also lower than the average performance of funds listed in Preqin and Burgiss in our sample time period. One possible interpretation for the lower performance is limited access: Israeli LPs may not be able to gain access to the top performing ("top quartile") funds. Israeli LPs are, on average, smaller than US LPs (Dyck and Pomorski (2016)). To gain perspective, the average AUM of the long-term savings institutions in our data set is equal to that of a pension fund ranked 20th by size in the US as of 2018.[4] Limited access may also be driven by the Israeli LPs' remote geographic location relative to the majority of PE funds (Da Rin and Phalippou (2017)) and perhaps by the perception of some fund managers that LPs based outside North America are less prestigious than leading local (US-based) LPs.

Prior investment experience may also affect access: established LPs may be better able to form connections with established fund managers (Lerner et al. (2007)). Israeli LPs are relatively new players in the PE market, although we do not find much evidence to support the conjecture that their access improves over time.[5] Conceptually distinct from limited access, though empirically not always straightforward to measure, LP performance may also depend on skill in identifying and selecting top performing funds and GPs (Cavagnaro et al. (2019)). We provide evidence that is consistent with both access and skill playing a role in explaining the inferior performance of Israeli LPs relative to the stylized facts on the performance of US-based LPs. We do not find evidence that these LPs pay higher fees relative to their US-based peers, in contrast with the evidence in Begenau and Siriwardane (2022). This conclusion is based on an analysis of the cash flows and performance of PE funds whose performance is reported by LPs in our sample and in Preqin on the basis of reports by other (non-Israeli) LPs; see section 6 below.

[4] Pensions & Investments ranking of the largest US public pension funds as of September 2017, available (here).
[5] Recent work by Goyal et al. (2021) disputes the importance of access to high performing funds as a major factor explaining the investment choices of LPs. Instead, they argue that the high growth rates of capital allocations to PE is likely to lead LPs to invest in first-time funds.

After presenting estimates of average performance for the LPs in our sample, we compare the performance of investments in local (within-Israel) vs. foreign (in the US and elsewhere) funds. Hochberg and Rauh (2013) argue that, in the context of US states, political interference and home bias in investments result in poor performance of local, within-state, investments of US public pension funds in PE relative to their out-of-state investments. By contrast, Morkoetter and Schori (2021) gather international data and find that IRRs in foreign PE and VC funds, defined as funds located outside the LP's home region, are lower than the realized IRRs in local, within-region, funds. Our evidence lends support to the latter view: we find that local, within-Israel, PE and other private funds consistently outperform foreign funds. This result holds across virtually all fund types (the only exception is hedge funds) and is especially pronounced for PE funds,[6] real estate and infrastructure funds. We attribute this finding to the LPs' superior access to top performing local funds, as well as to their skill in selecting local first time funds, which appears to be better than their ability to select foreign funds.

Finally, we also examine the possibility that the difference in returns realized by LPs in our data set and those reported by US-focused studies may be related to the nature of coverage in Preqin (we also make some comparisons with Burgiss), databases commonly-used in the literature. Although it has been argued that data derived from Preqin and Burgiss are generally not severely biased (Kaplan and Lerner (2017), Harris et al. (2014), Brown et al. (2015)), we find a large discrepancy in performance between the universe of funds that are held by LPs in our sample and the subset of these funds which are also included in Preqin. Funds that are missing in Preqin are not necessarily non-US based, but are typically small funds that exhibit poor performance relative to funds which are included in Preqin.[7] This suggests that, while Preqin may be useful in estimating the returns generated by the PE/VC industry as a whole, it may not reflect precisely the returns realized by LPs who choose to, or are forced to, invest in relatively small funds that are unlikely to be top

[6] Nearly all the PE funds in our data set, both local and foreign, are "generalists," that is, funds which do not specialize in a particular industry. Therefore, differences in fund specializations between local and foreign funds cannot account for the performance differences we observe.

[7] Andonov et al. (2021) find that funds included in Preqin tend to exhibit superior performance relative to other funds; Andonov et al. (2018), Internet Appendix Table XXI, document a positive correlation between performance and the probability of appearing on Preqin.

performers.[8]

The rest of the paper is organized as follows. Section 2 provides a description of the institutional investors in our data set and the pension system in Israel. Section 3 presents the data, and section 4 the methodology and research design. In section 5 we present measures of realized performance for the institutional investors in our sample, including heterogeneity in performance by fund and institution characteristics. Section 6 presents a comparison of our data set with data from Preqin, and Section 7 concludes.

2. Institutional Background

This study is based on extensive and detailed data provided by institutional investors in Israel as part of their mandatory monthly reports to the Capital Market, Insurance, and Savings Authority at the Ministry of Finance. We access information on the eight largest institutions, managing 76% of all long-term (retirement) savings in Israel. We utilize only the eight largest institutions since the smaller institutions have been involved in mergers and splits, impairing the completeness of their reported cash flows.

The institutional investors in our data set manage three different saving instruments: pension funds, life insurance savings policies, and provident funds which are a long-term savings instrument that differs from a pension fund in some technical respects that are not relevant to the discussion here. In terms of asset allocation, life insurance funds have the highest percentage of illiquid assets (our focus is on PE , VC, and other types of private funds), mainly because there are no transitions of savers across different funds.[9] Provident funds are characterized by a low percentage of illiquid assets primarily because of the high level of competition in this segment and the frequent transitions of savers across different funds. Finally, pension funds are the fastest growing saving instrument

[8] Studies investigating PE and VC fund performance from the fund's (rather than the LP's) perspective often use Burgiss, which is arguably more precise than Preqin. Data provided by Burgiss, however, cover LP investments only partially, maintaining the anonymity of both the funds and the LPs. The Burgiss data set "is sourced exclusively from LPs and includes their complete transactional and valuation history between themselves and their primary fund investments." (Harris et al. (2010))

[9] Whereas savers can change the investment track or the managing company at no cost in most long-term savings instruments, they face significant switching costs in life insurance products. See a detailed discussion in Hamdani et al. (2017).

in Israel, largely due to a law enacted in 2008 which requires individuals to deposit funds into these savings instruments. The three saving instruments also differ in certain dimensions that are not directly relevant to the present study such as their fee structure and extent of competition. The institutional investors in our data set manage pension funds and other long-term savings instruments, as well as their own accounts, which we refer to below as their "nostro" accounts.[10]

The Israeli long-term savings market has undergone significant changes over the last fifteen years, mainly due to a regulation that forced banks to sell their long-term savings products to other institutions, primarily to insurance companies and other non-bank investment managers, some of which had managed mutual funds prior to the reform. As a result of this reform, and a 2008 law mandating savings for retirement by all, these institutions have experienced rapid growth in their AUM.

Table 1 presents the AUM by institutions in our data set as well as their investments in PE (including real estate, infrastructure and debt funds), VC and hedge funds, both local and foreign, as of the end of 2019. The values in parenthesis represent the percentage of assets managed by the institutions in our data set relative to the assets managed by all institutional investors in the long-term savings market in Israel. The institutions included in the sample account for 76% of total AUM, 81% of total investments in PE and about 87% of total investments in VC funds. We are aware of no reason to expect that the smaller institutions not included in our data set are fundamentally different than those included.

The rapid growth in these institutional investors' AUM, as well as the low interest rate environment of the past decade, have led to an increase in their propensity to invest in alternative, illiquid assets: real estate, private (non-traded) loans, as well as PE, VC and other private funds. The NAV of investments in PE , VC, and other types of private funds has grown dramatically, from two billion ILS (about 500 million USD) in 2005 to 70 billion ILS (about 21 billion USD) in 2019. As presented

[10] Life insurance is the largest savings instrument in the Israeli long-term savings market and is managed by five of the eight institutions in our data set. In total, there are ten institutions managing life insurance products in Israel. Provident funds include mainly two saving instruments, differentiated by their investment horizon (long-term and medium term). All institutions in our data set manage both types of provident funds. In total, there are about 30 asset managers offering this saving instrument in Israel. Pension funds mainly include two savings instruments: mandatory pension savings and optional pension funds; the two types of funds are managed by both commercial institutional investors (included in our data) and by non-profit organizations such as certain labor unions.

in the Internet Appendix Tables A1 and A2, much of the growth is driven by the increase in foreign, non-Israeli, funds, where Israeli institutional investors have invested twice as much as in local funds. Interestingly, only 7% of their investment are in VC funds (93% in PE and other private funds), and 70% of the VC investments are local.

3. Data

We use two main data sources. The first is the complete series of daily cash flows from the eight largest institutional investors in Israel generated from their investments in private equity, venture capital, real estate, infrastructure, debt, and hedge funds. We study the investment outcomes in 308 PE funds, 120 VC funds, 247 other types of private funds (real estate, infrastructure and debt funds), and 144 hedge funds over the period 2000 - 2018. The investments are divided by savings products, that is, pension funds, life insurance, and provident funds, as well as the institutions' own investment (their "nostro" accounts). In addition to the daily cash flows related to each savings product and to the nostro account, our data set contains the NAV for each PE, VC, or other fund types.

The split between savers' retirement assets and the institutions' own accounts enables us to rule out possible concerns about conflicts of interest in the context of PE and VC investments. For example, a possible concern might be that institutional investors would invest in well-performing funds through their nostro accounts, when facing limited access to the top quartile funds. In practice, we find that there is an overlap of close to 90% between the funds associated with nostro and savings accounts, yielding almost identical performance for private funds allocated to savers and those allocated to the institutions' own accounts.[11]

The second data set we use is Preqin, one of the most commonly used data sets in the academic literature on private equity (see, Harris et al. (2010) and Brown et al. (2015)); we also make a few

[11] Table A3 in the Internet Appendix provides a comparison of performance of nostro accounts with saving products managed for external savers. With the exception of one institution (Institution F) there is no evidence for outperformance of the nostro accounts relative to the savings products. The exceptional case of Institution F is apparently due to one successful Israeli PE fund in which the institution invested through its nostro account and not through the saving products.

comparisons to Burgiss, another major data source, although the fact that this source does not disclose fund and LP identities precludes a detailed analysis. We use data from Preqin to compare PE and VC funds that are included in our data set to PE and VC funds listed in Preqin. The data provided by Preqin is gathered from multiple sources including voluntary data contributions.[12] The voluntary aspect of these reports raises the concern that funds reporting their performance to Preqin are not a random sample, or do not reflect the entire universe of funds. To examine these issues, we ask, for each fund in which the LPs in our data set invest, whether it is also listed in Preqin. For overlapping funds, we calculate performance using both the cash flows as they appear in our data set, as well as the cash flows reported by Preqin. We also record the size of the fund and its country of incorporation. In cases where the fund appears in Preqin, we draw this information from its listing details. In cases where the fund does not appear on Preqin, we obtain this information from the fund's website and from the LPs themselves.

4. Methodology and Research Design

We measure fund performance using the public market equivalent (PME) approach of Kaplan and Schoar (2005), as this performance metric is considered superior to other commonly used methodologies such as the internal rate of return (IRR) and the cash multiples (Gottschalg et al. (2007), Phalippou (2008)).[13] We calculate the aggregate PME for each limited partner by pooling all cash flows generated from each of their investments in PE, VC and other types of funds. In essence, this generates for each LP a single, weighted average portfolio performance metric, consisting of all the LP's investments in PE and other private funds, where the weights are the amounts invested in each fund. We also compute aggregate PME for investments by fund type (PE, VC, real estate, etc.) by aggregating the full daily cash flow for each fund type across all LPs.

[12] As stated on their website, "Since 2003, we have built valued relationships with fund managers, institutional investors and other industry professionals who are happy to provide us with data on their activities. We also obtain our data via various FOIA (Freedom of Information Act) requests, public filings and industry-recognized news sources. While FOIA remains an important source of data, Preqin also receives voluntary data contributions from more than 12,000 fund managers, and more than 10,000 funds."

[13] IRR and cash multiples may lead a bias in estimates of performance including over-estimation of the variation in performance across funds and of the performance of the top quartile of funds. These measures are also amenable to manipulation, possibly distorting the fund manager's incentives. Phalippou (2008) claims that IRR is probably the worst performance metric one may use in an investment context, whereas the use of PME yields more reliable conclusions.

We use several equity and debt indices as benchmarks. For equity, we use tradeable ETFs (the available alternative to investment in private funds) tracking the following indices: (1) S&P 500: the 'SPDR' ETF; (2) Tel Aviv (TA) 125: the 'KESEM TA 125' ETF; (3) NASDAQ: the 'QQQ' ETF; (4) MSCI World: the 'iShares MSCI World' ETF; (5) MSCI ACWI: the 'iShares MSCI ACWI'. For debt benchmarks we use tradeable ETFs tracking the following indices: (1) ICE BofA US High Yield Index Option-Adjusted Spread and (2) iShares iBoxx $ High Yield Corporate Bond ETF. All our calculations end in December 2019, so that inferences are not affected by the onset of the COVID-19 pandemic. We compute PMEs both for funds that were liquidated, where the NAV is effectively zero, and for funds which are still alive, using the NAVs reported in the financial statements at the end of 2019. All flows and benchmark returns are converted to US dollars, so that the changes in the exchange rate do not affect our results. In any event, virtually all private funds in our sample, both within and outside Israel, operate and publish financial reports in US dollars.

5. Results

5.1. Unconditional Performance

Table 2 presents PMEs calculated relative to six different indices. The PMEs are below 1.0 relative to the S&P 500 for all but two institutions, with an average of 0.94. Relative to the NASDAQ, the PMEs are much lower, below one for all but one LP, with an average of 0.83. Relative to the Russell 2000, the average PME is also just below one. The average PME's relative to non-US benchmarks is slightly higher (close to 1.1). Overall, it is evident that investments in the broad PE and VC asset classes have not outperformed the major US indices. In addition, the PMEs for funds established before 2010 ("liquidated funds") tend to be lower than the PMEs for the full sample, indicating that the relatively low returns realized by the Israeli LPs in our sample are not driven by "living" funds with positive net asset values (NAVs). Apparently, Israeli, and possibly other foreign (non-US-based) LPs, earn, on average, returns that are somewhat lower than those reported in the

extant literature for US-based LPs.[14]

To corroborate the finding that the LPs in our sample have earned lower returns relative to those documented for US-based LPs, we also compare the Israeli LPs' PMEs to PMEs derived from Preqin and Burgiss for PE and VC funds which are located in Israel and in the US (as are the vast majority of the funds in our sample), for our sample period, 2000-2018. We find that the aggregate PME relative to the S&P 500 is equal to 1.04 in Preqin and 1.05 in Burgiss, substantially higher than the average PME generated by the investments of Israeli LPs.[15]

The underperformance we document may be due to the limited access of foreign LPs to top performing, typically US-based, funds or possibly due to their poor skill in identifying promising first-time funds. We elaborate on the empirical approach we use to draw these conclusions and on the required assumptions below. We also explore below the possibility that some performance differences may be "technical" rather than "economic," due to possible limitations in the coverage of Preqin and Burgiss.

5.2. Performance by Fund Type and Location

Table 3 presents average value-weighted PMEs, calculated by aggregating the cash flows for each fund type and geographical location across LPs. The results indicate that investments in local (Israeli) funds are associated with higher PMEs in comparison with investments in foreign, non-Israeli, funds, although the magnitude of the differences are not always economically large. This result is consistent across all fund types, both equity and debt, with the exception of hedge funds (relative to the S&P 500 index). For PE funds, while the average PME of Israeli funds relative to the S&P 500 index, is 1.11, the PME of foreign PE funds is about 0.95. Large differences in PME between local and foreign funds exist also for real estate (0.94 vs. 0.81) and infrastructure funds (0.96 vs. 0.81). For VC funds, investments in Israeli funds are associated with a rather low

[14] The comparison, however, is not perfect since different studies use different samples and different time periods. See also Josh Lerner's testimony at the SEC (Link), suggesting a PME of slightly above one for US buyout funds in recent years relative to the Russell 3000 index.

[15] It is also possible to weigh the Preqin and Burgiss fundss by vintage, so as to match the distribution of funds in our sample over vintage years. The results are qualitatively similar, with substantially higher average PMEs from Preqin and Burgiss than the ones calculated in our sample.

PME of 0.87 relative to the S&P 500, which is still slightly higher than the PME of 0.85 associated with foreign VC funds. In passing, the low PMEs associated with VC funds suggests that the rents from investments in tech firms in the "startup nation" probably accrue either to the entrepreneurs and/or to top foreign VC funds to which the LPs in our sample may not have access.[16]

The superior performance of local vs. foreign funds is evident also in debt funds: The PME of local debt funds relative to *ishares* High Yield ETF is 1.08, while the PME of foreign debt funds is 0.93. Hedge funds, which are different from the other fund types in the sample in their organizational structure and focus on investments in traded securities, are the only exception, where we find that foreign hedge funds outperform local hedge funds. The general pattern in which local funds outperform foreign funds remains unchanged when we use alternative benchmarks.

Table 4 presents the average PMEs of PE and VC funds included in Preqin and Burgiss, by geographical region. Both PE and VC funds that are listed in Preqin and Burgiss and located in the US have higher PMEs than the foreign, non-Israeli, PE and VC funds in our sample. The value-weighted average PME for PE funds located in the US drawn from Preqin (Burgiss) is 1.13 (1.12), while the average PME for foreign PE funds in our sample is 0.95. Similarly, the average PME in Preqin (Burgiss) for VC funds that are located in the US is 0.90 (1.02), while the average PME using our sample is only 0.85. It is challenging to draw any firm conclusions regarding Israeli PE and VC funds included in Preqin and Burgiss since the number of observations is very small.[17]

As an alternative to the value-weighted average PMEs, we also calculate PMEs based on equal weights, that is, where each fund is assigned a weight of one over the number of funds in the portfolio, regardless of the amount invested. The equally-weighted average PME relative to the S&P 500 is 1.15 for the Israeli PE funds and 0.97 for foreign PE funds (the comparable value-

[16] These results are not driven by exchange rates fluctuations, as all flows used in the PME calculations, both to investment funds and to the public market used as a benchmark, are denominated in, or converted to, US dollars. In addition, the results are not driven by extreme observations and are qualitatively similar when comparing median rather than average PMEs in local and foreign funds.

[17] The discussion here is focused on US-based funds because most of the investments of the Israeli LPs in foreign funds are concentrated in the US. The average PME in European funds in our sample is not statistically different from that of US-based funds in which Israeli LPs invest. Harris et al. (2016) report that the performance of European PE funds is similar to that of US-based funds during their sample period which ends in 2010, in line with Table 4, while VC funds in Europe under-perform relative to their US peers. These findings are not inconsistent with the evidence regarding the relatively poor realized performance of Israeli LPs since we focus on the location of the LP, rather than on that of the fund or the GP.

weighted figures are 1.11 and 0.95, respectively, see Table 3). The equally-weighted average PME for Israeli VC funds relative to the S&P 500 is 0.97, while the PME for foreign VC funds is 0.85 (the comparable value-weighted figures are 0.87 and 0.85, respectively). The differences between Israeli and foreign PE/VC funds continue to hold and are statistically significant with a p-value $< 5\%$.

The fact that the PMEs calculated using equal weights are higher than the value-weighted average PMEs implies that the LPs in the sample invest larger amounts in funds whose performance is relatively low, perhaps due to limited access to high-performing funds, which are either not available at all or limit the amounts the LPs in our sample can invest in them. Stated differently, the difference in performance measures is consistent with decreasing returns to scale in these investments. Interestingly, the difference between the equally-weighted and value-weighted PMEs appears to be larger for Israeli PE/VC funds than for foreign funds. One interpretation of this finding is that, while the LPs in the sample face a constraint on the amounts they can invest in Israeli funds due to the small size of the market, investments in foreign funds tend to be concentrated in medium-performing funds. This may explain both the lower average performance of foreign funds relative to local (Israeli) funds, as well as the smaller gap between PMEs calculated using equal weights and value weights in foreign funds.

In order to compare the performance of the Israeli PE, VC and other funds to that of foreign funds we estimate regressions where the dependent variable is fund performance (PME) relative to a benchmark. Each observation is an investment in a specific fund by a specific LP. We control for the fund's geographic location (location in Israel vs. elsewhere), fund type (PE, VC, debt, real estate, infrastructure, and hedge funds), and the fund's vintage year. Standard errors are clustered at the unique fund and the vintage year levels.

Table 5 presents the results. The coefficient of interest, the dummy variable denoting local funds, is positive and highly significant for all benchmarks and across the different specifications, indicating that local investments in PE and other funds outperform investments in foreign funds. The magnitude of the difference in PMEs between local and foreign funds is in the range of 10 - 19 basis points, depending on the benchmark and the specification. This is an economically large difference,

given that the average PME is typically close to, or a bit below, one. In addition, we find that buyout funds, the omitted category, outperform almost all other fund types.

To make sure these findings are robust, we also evaluate the performance of Israeli and foreign funds that have already been liquidated and their remaining net asset value is zero. We focus on funds that were established prior to 2010; we do not include more recent funds where a NAV of zero may be due to extreme write-offs. The sample of liquidated funds is not subject to concerns associated with the "J-curve" of returns and the possibility that net asset values do not reflect an unbiased estimate of future payoffs. The results, presented in Internet Appendix Table A4, indicate that the coefficient of interest, the Israel dummy, is positive, somewhat larger than in the full sample, and highly significant across different specifications. We conclude that our results are not driven by investments in funds that are still operating. In another robustness test we control for fund size. The results presented in Internet Appendix Table A5 indicate that the local PE and VC funds outperform the foreign funds even after controlling for the size (AUM) of the fund and the magnitude of the coefficient on the Israel dummy is similar to that reported in Table 5.

The evidence indicating differences in performance of local and foreign funds differs from that in Hochberg and Rauh (2013) in that local investments in our sample outperform, on average, foreign investments. The amounts invested within Israel are relatively low in comparison with the amounts invested in foreign funds and the realized returns on the large amounts invested overseas are not as high. One interpretation of this evidence is that Israeli LPs have limited access to the top performing foreign, notably US-based, funds. Alternatively, non-US LPs may have poor skills in selecting first-time foreign PE, including real estate, infrastructure and debt funds, and VC funds. There may, of course, be other reasons why local investments may outperform foreign ones, such as contractual agreements (fees) that are less favorable to non-US LPs. Below we present evidence consistent with the first two explanations, but less with the third one.[18]

[18] Hochberg and Rauh (2013) attribute the poor performance of local funds to political pressure and interference (see also Andonov et al. (2018)); This type of pressure is apparently not very common in our sample of LPs.

5.3. First-time vs. Seasoned Funds

The previous section indicates that the investments of the Israeli LPs in local, Israeli, funds have outperformed their investments in foreign funds. One interpretation of these results is limited access to the top performing foreign funds by Israeli LPs. In addition, these results may also be due to the LPs having better local fund selection skills in comparison with their ability to select foreign funds. We explore this issue further in this section.

Following Sensoy et al. (2014), we compare the investment performance of LPs in our sample in first-time vs. seasoned funds.[19] According to Sensoy et al. (2014) the performance of first-time funds is likely to be inferior to that of more mature funds, and the demand for first-time funds by LPs also tends to be lower in comparison with the demand for seasoned fund investments, that is, access to first time funds is not restricted (Lerner et al. (2011)). We therefore compare the realized PMEs of the Israeli LPs' investments in first-time local funds vs. first-time foreign funds, so as to shed light on the LPs' selection skills in funds that have no previous track record and are not subject to investment constraints that might characterize seasoned funds with limited access.

We first calculate the proportion of local and foreign investments in first-time funds. One possible motivation for investments in first-time funds is limited access to funds with better reputation. Unfortunately, it is not straightforward to test this conjecture without information on the populations of first time and seasoned funds in Israel and abroad. In practice, 25% of investments in foreign funds are in first time funds, whereas 40% of investments in Israeli funds are in first-time funds. This may be driven by the substantial development of the Israeli PE and VC industry in the last two decades. Put differently, Israeli LPs face a larger "supply" of first-time funds at home, in comparison with foreign first-time funds. Another interpretation may be that, when considering whether to invest in local funds, LPs have "informal" sources of information that help them evaluate the abilities of local first-time funds managers. For example, they might have worked with the person in a different setting. When considering an investment in first-time foreign fund managers, such "soft" or "informal" sources of information are much more limited.

[19] Hedge funds are excluded from this analysis because the distinction between first-time and seasoned funds is not as clear in the context of hedge funds as it is for PE and other funds whose lifetime is limited.

We adopt a simple OLS regression specification to compare the performance of investments in first-time funds with the performance of more established funds. The dependent variable is the PME of each fund using the 'SPDR' ETF to benchmark against the S&P 500. We include fund type, vintage year, LP fixed effects, and a dummy variable which equals one for first-time funds and zero otherwise. We also distinguish between Israeli and foreign investments.

Table 6 presents the results: While there is no statistically significant difference in performance between investments in local first-time funds and local seasoned funds, investments in foreign first-time funds yield lower PMEs than investments in seasoned foreign funds. Because investment in first-time funds is less likely to reflect constraints due to limited access, this finding may indicate that the LPs in the sample have better skills in selecting local PE, VC, or other fund types, in comparison with their ability to identify promising foreign ones. This conclusion holds, however, only under the assumption that the distribution of fund quality is similar among local and foreign funds; while this assumption is plausible, it is challenging to confirm it using the data available to us.

Table 7 provides additional estimates on the performance gap between local and foreign funds, distinguishing between first-time and seasoned funds. The dependent variable is the fund PME calculated relative to three benchmarks: S&P 500, Tel Aviv 125 and the Russell 2000. The dummy variable *Israel* equals one if the fund is local and zero otherwise. As in previous tables, we control for the vintage year of the fund, and include LP and fund type (buyout, VC, infrastructure, real estate, and debt) fixed effects. The coefficient of interest, the dummy variable denoting local funds, is positive and highly significant in all specifications and across the two different sub-samples, first-time as well as seasoned funds. This may be interpreted as evidence that the superior performance of local funds in comparison with foreign funds (Table 5) is driven by two factors. First, better access to reputable local funds, reflected in the performance of seasoned local funds in comparison with seasoned foreign ones, since investments in top performing seasoned funds are likely to be subject to limited access. Second, better selection skills, as reflected in the performance of local first-time funds in comparison with foreign ones, again, subject to the assumption that the distribution of fund quality does not vary with fund location.

5.4. Reinvestment Decisions

Following Lerner et al. (2007) and Sensoy et al. (2014) we evaluate the reinvestment decisions of the sample LPs in local and foreign funds. This is an alternative way to evaluate the information available to the LPs: Because LPs that have participated in a fund typically get access to the same GP's follow-up fund, reinvestment decisions are unlikely to be subject to any access constraints. The analysis below is based on funds for which a follow-up fund was established. Within this sub-sample, we compare funds where the LP decided to invest in their follow-up funds, and "abandoned" funds, where the LP did not invest in any available subsequent fund. It is important to note that the decision to invest in a follow-up fund takes place about half-way through the life of the current fund (i.e., before the fund's final performance measures are realized and revealed to investors). We therefore consider the decision to invest in a follow-up fund as reflecting the LP's information and skill.

Table 8 presents PMEs relative to the S&P 500 for local and foreign PE and VC funds, split between "reinvested" and "abandoned" funds, where the term "reinvested" refers to current funds in which the LP has decided to invest a follow-up fund, and the term "abandoned" refers to current funds with follow-up funds in which no investment was made. The main result is that funds that experience reinvestment, both local and foreign, tend to outperform abandoned funds. The differences are statistically significant for all fund categories except for foreign VC funds (where the number of observations is small). The difference between reinvested and the abandoned funds is larger for local funds than for foreign funds (statistically significant with a p-value$<$1%), which may be interpreted as another indication of the Israeli LPs having better information on the local population of funds than that of foreign funds, again subject to assumptions about the distribution of fund quality in the population.

We also analyze the effect of LP experience, measured as the number of past investments in PE, VC, or other fund types, on performance. The results in Table 9 suggest that, in fact, PMEs are negatively related to experience: In a regression framework, where the dependent variable is the PME measured relative to the S&P 500, and the explanatory variables include the natural logarithm of the cumulative number of past investments for each LP, as well as our standard set of controls,

the coefficient on the LP's past investments in the sub-sample of foreign funds is negative, larger in absolute value, and more statistically significant than the comparable coefficient in the sub-sample of Israeli funds (which is not statistically different from zero). This finding may be explained by the fast growth of the LPs' assets under management over the past decade and their demand, or search, for investible foreign funds. This decreasing-returns effect may offset the improved access, if there is any, due to the LPs experience and familiarity with the industry.

5.5. Further evidence on heterogeneity in fund performance

In this section we present two additional tests that are meant to trace the sources of performance differences between local and foreign funds. We compare the distribution of PMEs derived from investments by Israeli LPs in foreign PE funds with a simulated distribution of PMEs using two populations of non-Israeli funds in Preqin. The first test utilizes all over-subscribed PE funds in Preqin, where over-subscribed funds are defined as funds where the ratio of their actual to "target" size is larger than one. The second test is based on a simulated distribution of PMEs from the population of under-subscribed PE funds in Preqin, where under-subscribed funds are defined as funds with an actual-to-target size ratio smaller than one. We add to the under-subscribed funds 94 foreign (non-Israeli) PE funds which are listed in our data set but are missing from Preqin, under the assumption that they are under-subscribed as well.

Our goal is to compare the actual, realized, performance of the LPs in our sample with what would have been obtained by a hypothetical LP drawing randomly, for each vintage year, a set of funds from either of these populations on Preqin. Each hypothetical portfolio of funds contains 336 PE funds, the same number of foreign PE funds in our data set. We repeat the formation of a hypothetical portfolio of funds (from either the under- or the over-subscribed funds on Preqin) a 1,000 times.

By comparing the actual distribution of foreign PE PMEs in our sample with the simulated distribution drawn from the population over-subscribed (non-Israeli) funds in Preqin, we can test the hypothesis that the LPs in the sample had unlimited access to these funds (that is, they could draw

funds from this population without constraints). By comparing the actual distribution of PMEs in our sample with the simulated distribution drawn from the population of under-subscribed funds in Preqin (where, by assumption, no access constraints exist), we examine if the Israeli LPs are able to avoid the worst performing foreign funds, or select more top-performing funds than their share in the population of under-subscribed funds in Preqin. To the extent that they do, such evidence would be consistent with the LPs having selection skills even when investing in foreign PE funds operating outside Israel. We measure PMEs relative to the S&P 500 and report the 5^{th} and 95^{th} bootstrapped confidence intervals.[20]

Panel (a) of Figure 1 presents the evidence based on the first test. We report the value of each ventile in the distribution of actual performance for foreign PE funds in our data set (in red) and the bootstrapped confidence intervals around each ventile from Preqin. The actual PMEs of the Israeli LPs are at the bottom of the confidence intervals of the Preqin PMEs in the lower PME ventiles, and well below the bootstrapped confidence intervals for the higher PME ventiles. We interpret this finding as a clear rejection of the null hypothesis that Israeli LPs have unlimited access to over-subscribed, top-performing non-Israeli, PE funds.[21]

The results for the second test, based on the population of under-subscribed funds in Preqin, are reported in Panel (b) of Figure 1. As before, the value of each ventile of the actual distribution of PMEs appears in red, together with the corresponding bootstrapped confidence intervals based on the population of under-subscribed funds in Preqin. There is some evidence consistent with skill: For example, the 5^{th} percentile of the actual distribution of PMEs is 0.66, whereas the simulated confidence interval ranges from 0.48 to 0.58. this could be interpreted as evidence against the null hypothesis of our LPs having no skill at avoiding very poorly performing foreign funds. We find similar evidence of skill in percentiles up to the 45^{th}. In higher percentiles, the actual PME (red dot) appears to be in the lower part of the simulated confidence intervals. This may be because the LPs in our sample face limited access not only to over-subscribed funds but also to some of the

[20] This test cannot be used to compare selection skills in Israeli and foreign funds because of the limited representation of Israeli PE funds on Preqin.

[21] In passing, it is interesting to note that, in an informal conversation with one of Israel's largest GPs, he argued that there were no access limitations in the opposite direction, that is, non-Israeli LPs have no difficulty gaining access to Israel's top GPs.

well-performing funds which are classified as under-subscribed in Preqin, an indirect and possibly not perfectly accurate measure of access constraints.

The evidence we present on limited access to reputable foreign (US-based) funds may point to a possible role of intermediaries in the PE and VC markets. These intermediaries, such as funds of funds, or separately managed accounts, may be able to provide non-US based LPs with some access to top performing US funds. In our data set the performance of foreign PE funds invested in through such intermediaries (N=23) is almost equal to that of other foreign (buyout) funds, indicating that the surplus, or rents, that might be generated by these intermediation services accrue mainly to the intermediaries which appear to enjoy monopoly power in this market.

Another possible approach for overcoming constraints on access to private funds, as well as for reducing costs, is co-investments, a term describing joint investments by an institutional investor and a PE (or other) fund, where the institution is not a "passive" LP, but an equal partner who participates in the decision making process and does not pay the standard management fees. Fang et al. (2015) document relatively poor performance of co-investment deals relative to the performance of the funds with which the institutions co-invest and attribute this result to the adverse selection of the deals in which institutions are able to co-invest. By contrast, Braun et al. (2020), who use a larger sample of deals than that of Fang et al. (2015), find no evidence of adverse selection and argue that there are a variety of reasons why funds (GPs) offer certain LPs opportunities to co-invest with them. The data available to us on co-investment deals involving LPs in our sample is limited and precludes a detailed analysis of this issue: We only observe the results (cash flows) for co-investment deals reported by the LPs in the sample, without any information on the fund with whom they co-invest or the nature of the deal. Subject to this caveat, the reported co-investment PMEs appear to be high relative to the full sample PMEs, with the average (median) PME for 22 co-investment deals with foreign funds of 1.31 (1.07) vs. 1.17 (1.04) for 51 co-investment transactions with local funds. The local co-investment deals appear to have taken place earlier (with 2014 as the median vintage year), whereas the median vintage year for co-investment deals with foreign funds is 2017. Nevertheless, because of the limited available data, we cannot draw any firm conclusions from this sample.

6. Comparison with Preqin

Our data set is based on highly detailed mandatory reports provided by the LPs themselves to the supervisory authority at the Ministry of Finance. It is therefore likely to be accurate, comprehensive in coverage, and free of biases which have been discussed in the literature in the context of commercial data sets such as Preqin. In this section we compare our data to Preqin, one of the most extensively used data sources in the literature, in order to better understand the determinants of non-US-based-LPs' investment performance, as well as to shed light on possible limitations associated with the use of statistics derived from Preqin.

We begin by documenting the extent of overlap between investments in PE and VC funds, as reported by the LPs in our data set, with the fund-level data, as reported in Preqin. We first identify funds included in the portfolios of the Israeli LPs in our sample as they appear on Preqin. For overlapping funds, we compare two performance measures, PME and IRR, based on our data set, with those derived from the available cash flow data in Preqin. There is a large number of funds that appear in Preqin but no further information on their cash flows is provided. In such cases, it is not possible to calculate fund performance based on Preqin. We therefore use the cash flows reported in our data set for overlapping funds which are included in Preqin without their cash flows, as well as funds which do not appear in Preqin at all. The cash flows are used to compute PMEs relative to the 'SPDR' ETF, tracking the S&P 500.

Table 10 presents the results, distinguishing between PE and VC funds, local (Israeli) and foreign, in our data set and in Preqin. Panel A presents the average PME for funds which are included in both our data set and in Preqin under the exact same LP and have cash flows reported in Preqin. Panel B presents the performance for funds appearing in both our data set and in Preqin under the exact same LP, for which there are no cash flows reported in Preqin. Panel C focuses on funds included in our data set but not in Preqin, while Panel D presents performance measures for funds included in Preqin but not in our data set.

Panel A shows that the PMEs of foreign, non-Israeli, PE funds yield identical results when using cash flows as reported in our data set or in Preqin (87 overlapping funds); other types of funds

include only a few overlapping funds, so it is challenging to draw unequivocal conclusions from this sub-sample. Importantly, the fact that we observe the same average PME across many overlapping PE funds, suggests that there are no major differences in the fees that Israeli institutional investors pay in comparison with the LPs on whose reports the Preqin data are based.

Panel B presents estimates of performance for funds included in our data set and in Preqin under the exact same LPs for which there are no cash flows reported in Preqin. We find that the average PMEs derived from the cash flows in our data set are mostly lower (with the exception of Israeli PE funds) relative to the funds in Panel A, which have their cash flows reported on Preqin. The average PME drops from 1.03 in Panel A to 0.94 in Panel B. One interpretation of this result may be that funds with poor performance do not share their cash flow data with Preqin.

Panel C presents the third comparison, focusing on funds included in our data set but not in Preqin. There is a significant number of such funds (148), in comparison with 280 overlapping funds. The PE and VC funds in this category, both Israeli and foreign, exhibit lower PMEs than the funds in Panel A.

Panel D presents the PMEs, as of the end of 2019, of the funds that are listed in Preqin but not in our data set between the years 2000-2018. While the performance of the foreign PE funds is similar to the performance of the overlapping foreign PE funds in Panel A, foreign VC funds that are listed in Preqin but not in our data set exhibit slightly lower PMEs than the foreign VC funds in Panel A. Though the performance of these funds is higher than the performance of overlapping foreign VC funds that do not have cash flow data (Panel B), and of VC funds that are completely omitted from Preqin (Panel C). The number of observations on foreign VC funds in our data set is too small to draw any conclusions from these comparisons, although it is possible to speculate about the existence of well-performing foreign VC funds which are not accessible to our LPs. This may also be related to the possibility that rents from successful tech investments in the "start-up nation" may accrue to foreign VC funds. Finally, it is also not possible to draw any firm conclusions from the Israeli PE and VC funds that are listed in Preqin and not in our data set mainly because of the limited number of such cases.

Table A6 in the Internet Appendix presents the IRRs of the different funds, in parallel to the evidence in Table 10. Again, performance is similar in our data set and in Preqin when both sources include cash flows, as can be seen in Panel A. Note that the extreme IRR values of the Israeli PE and VC funds among the overlapping funds in Panel A which have cash flow data in Preqin is driven by the fact that Preqin has data on a very limited number of funds (only five Israeli funds in each category). The average performance is therefore largely affected by extreme values. For example, the Israeli PE funds have an average IRR of -6.79%, a result driven by one well-known Israeli fund with an IRR of -90%.

Panel B of Table A6 includes the funds that are listed in both data sets under the same LP but do not have their cash flow data reported in Preqin and Panel C includes funds that do not appear in Preqin at all. For the full sample, the average IRR in Panel A (11.50%) is much higher than the average IRRs in Panel B (3.4%) and Panel C (1.8%). The same pattern holds for foreign PE funds, a large enough category in all three panels, where the overlapping funds in Panel A exhibit a much higher average IRR (about 12%) than the corresponding figures for PE funds in Panel B (about 5%) and Panel C (about 2%). The other categories are too small for meaningful comparisons across the table panels.

The comparison presented so far suggests that, while Preqin may provide a reliable indication of the overall performance of the PE or VC industries, it does not necessarily provide an accurate reflection of the returns realized by the LPs in our sample and possibly by other institutional investors not based in the US. We now turn to examine more formally if there are any fund characteristics which are relevant to the probability of being included in (or excluded from) Preqin. Table 11 presents the comparison between a fund's country of incorporation and the average AUM of the overlapping funds and the funds that are not listed in Preqin. The table includes four panels: Panels A and B present funds by country of incorporation. These include the US, Israel, the UK, and other countries (Europe and East Asia) for overlapping funds and funds that are not listed in Preqin. Panels C and D compare the average fund size in millions of US dollars of the two fund groups.

The results in Panels A and B of Table 11 indicate that Preqin tends to miss not only funds located outside the US: the proportion of omitted funds located in the US is similar to the general rate of

omission. In addition, PE funds are more likely to be omitted than VC funds, with US VC funds much less likely to be omitted than Israeli VC funds.

Panel C and D present the average fund size in the different groups of funds. The average PE fund size is much smaller among the funds that are not listed in Preqin in comparison with overlapping funds. In US funds, the average omitted fund is almost half the size of the average overlapping fund. Omitted US VC funds are also smaller than the overlapping US VC funds. This is not the case for Israeli VC funds, although the small number of overlapping VC funds, Israeli and foreign, makes it difficult to make comparisons between PE and VC funds in this respect.

Table 12 presents Probit regressions, estimating the association of fund characteristics with the probability of being included in Preqin. We measure the effect of fund performance using PMEs relative to the S&P 500, and IRRs. Fund characteristics include fund size, measured in millions of US dollars; vintage year, where funds established prior to 2008 are the omitted category; and the fund's country of incorporation, where funds located in the US are the omitted category. We use three samples: (i) funds located in the US; (ii) funds located outside the US; and (iii) the full sample.

The results suggest that better performance is associated with a higher probability of being included in Preqin. The coefficients on performance are highly significant in all specifications, for both funds located in the US and elsewhere. Larger funds are also more likely to appear in Preqin; this effect is more pronounced for non-US funds in comparison to funds which are based in the US. Funds established before 2008, the omitted vintage group, have a higher probability of being listed in Preqin than later funds. This puzzling result may be due to the large increase in the AUM of the Israeli LPs and their rapidly growing investments in this asset class. Growth may have forced the LPs in our sample to invest in first-time funds, whose probability of being listed in Preqin is presumably low. This interpretation is in line with Goyal et al. (2021), who find that LPs whose capital allocation to PE is fast growing are more likely to invest in first-time funds. It is also in line with our finding that experience (number of past investments) is not associated with higher PMEs.

Finally, we analyze the association of fund characteristics with the probability of having cash flow data reported on Preqin. We restrict attention to funds which appear in that data base. The specification is similar to that used in Table 12 except that the dependent variable takes the value one if the fund has cash flows reported on Preqin, and zero otherwise. The results indicate that performance and size play an important rule in determining whether a fund's cash flow data appear on Preqin: Better performance and larger fund size are associated with a higher probability of having cash flow data on Preqin. In addition, we find that funds which are located in the US are more sensitive to performance, while for funds which are located outside the US, size has a larger effect on the probability of having cash flows reported in Preqin.

We conclude that data on Preqin is unlikely to reflect the investment experience of non-US LPs. In addition to the substantial number of funds that appear in our data set but not in Preqin, the omitted PE funds' performance appears to be systematically poorer relative to that of included funds. In addition, we find that missing PE funds are mostly smaller than the overlapping funds. Stated differently, although Preqin may represent well the performance of the PE industry and of top US LPs, its under-representation of small and not-top-quartile funds may be important for evaluating the choice set of foreign LPs. As noted above, our findings on the (non-random) reporting omissions in Preqin are consistent with claims made by Andonov et al. (2021) and statistics reported in Andonov et al. (2018). In addition, the claim that Preqin and Burgiss tend to yield similar average performance measures (Harris et al. (2010)) suggests that Burgiss (which does not disclose fund and LP identities, so that a direct comparison is not possible), much like Preqin, does not reflect accurately the investment experience of non-US LPs.

7. Conclusion

In this paper we utilize a newly-assembled data set on all investments by Israeli pension providers in PE and other private funds over the past 20 years. Our detailed data contain complete cash flows to and from each fund and each investor, allowing us to evaluate fund performance using PME measures (rather than IRR or cash multiples), which have been hitherto unavailable for non-US-based limited partners. Our study contributes to the literature that seeks to shed light

on investments by non-US LPs in PE, VC and other private funds, especially in the context of performance comparisons between local and foreign funds. In addition, we try to shed light on some of the limitations of Preqin in this context.

We find that Israeli LPs' performance in their investments in private funds is slightly lower than the estimates reported in the US-based literature. This difference in performance is consistent with both limited access by foreign LPs to top-performing, seasoned, US funds, as well as with lack of skill in selecting first-time, non-Israeli funds. We also find that, in contrast to Hochberg and Rauh (2013) who emphasize the detrimental role of political interference in investment decisions of US public pension funds, investments in local, Israeli funds, especially PE, real estate and infrastructure funds, have outperformed investments in foreign, non-Israeli funds. We argue that this result is likely to be due to limited access by non-US LPs to top-performing foreign (notably US-based) funds; it may also be due to the LPs relatively poor skills in selecting first-time foreign, US-based, PE and other funds in comparison with their ability to select first-time funds at home. Unlike Hochberg and Rauh (2013), political interference in the investment decisions of the LPs in our sample appears to be limited. Finally, we do not find evidence consistent with differential fees.

Our analysis is consistent with the existence of two opposing forces that may be at play: On the one hand, as their assets under management grow, LPs may become more established and improve their access to top performing funds. On the other hand, as their assets under management grow, LPs may be forced to invest more in "mediocre" funds and first-time funds. The assets managed by the Israeli LPs in our sample have grown dramatically over the last 20 years and their investments in foreign funds have also grown at a high rate, much like other institutional investors in many countries outside the US. The fact that this growth, and experience in PE/VC investments, is not associated with improved investment performance suggests that the latter effect, the decreasing returns to scale, has been dominant.

Finally, we compare our data and performance measures to those derived from Preqin, one of the most commonly used commercial data bases, finding that Preqin tends to omit small PE funds, as well as funds with poor performance, both within and outside the US, at roughly the same rate. This suggests that relying on Preqin to measure the investment performance of non-US-based LPs

may not be appropriate. At the same time, the comparison with data reported in Preqin suggests that differences in fees do not drive differences in performance between the LPs in our sample and US-based LPs.

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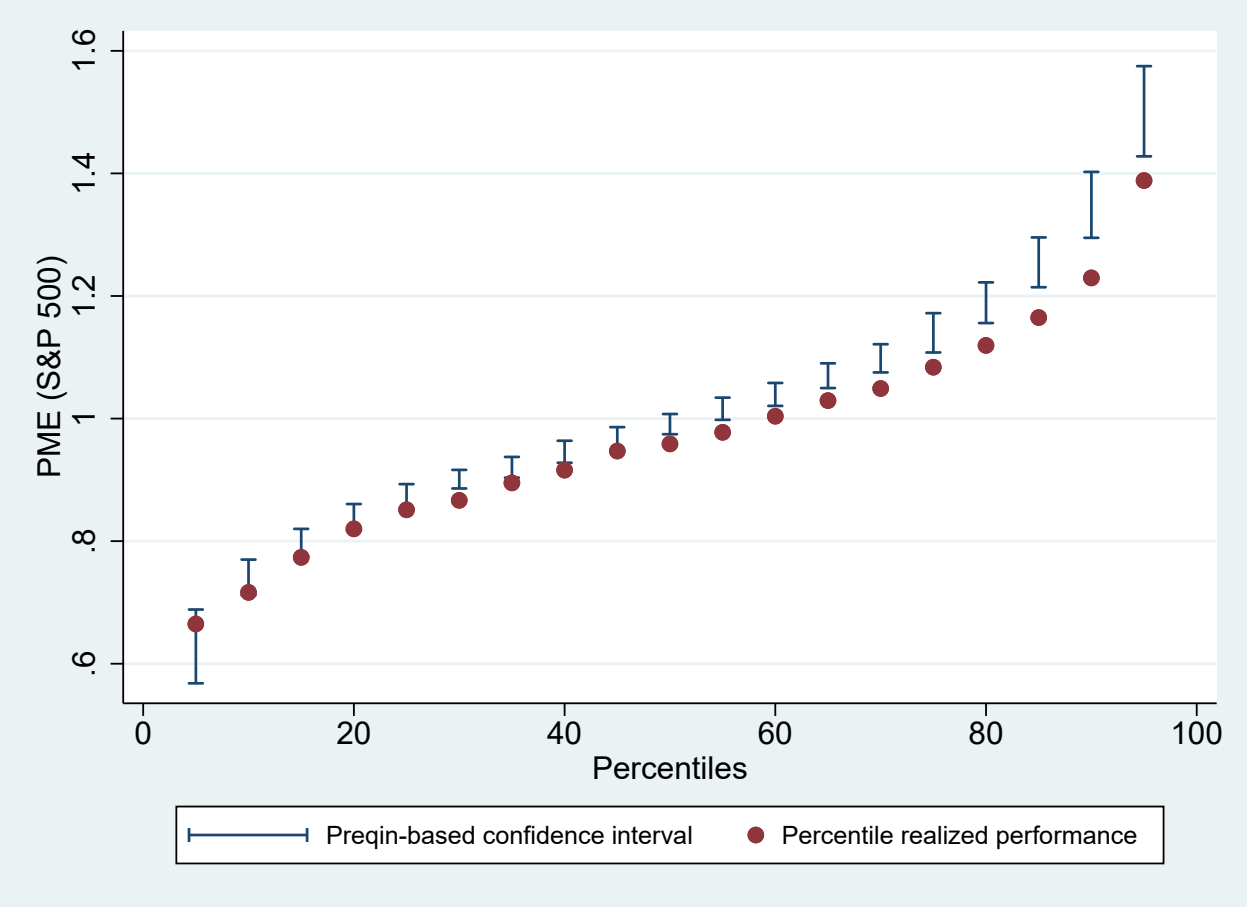
Figure 1: **PE Performance: Realized PMEs vs. simulated performance based on randomly-drawn funds from Preqin**

In this figure, we compare the realized PMEs of the Israeli LPs in our sample in their investments in foreign PE funds with what would have been obtained by a hypothetical LP, who would randomly draw, for each vintage year, the same number of funds from Preqin. Each hypothetical portfolio of funds includes 336 PE funds, the number of foreign PE funds in our data set. We repeat the formation of such a hypothetical portfolio of funds 1,000 times. Panel (a) presents a comparison based on drawing from the population of over-subscribed funds in Preqin, defined as funds where the ratio of their actual to "target" size is larger than one. We report the value of each ventile of the distribution of actual performance for funds in our data set (in red) together with the bootstrapped confidence intervals of each ventile from Preqin. Panel (b) presents a comparison based on a simulated distribution of PMEs drawn from the population of under-subscribed in Preqin, defined as funds with an actual-to-target size ratio smaller than one. We add to this population 94 funds that are included in our data set but are missing from Preqin, under the assumption that they are under-subscribed as well. The value of each ventile of the distribution of actual performance for funds appears in red, together with the corresponding bootstrapped confidence intervals based on the population of under-subscribed funds in Preqin. We measure PMEs relative to the S&P 500 and report the 5^{th} and 95^{th} bootstrapped confidence intervals.

Panel A: Comparison with over-subscribed funds in Preqin



Panel B: Comparison with under-subscribed funds in Preqin

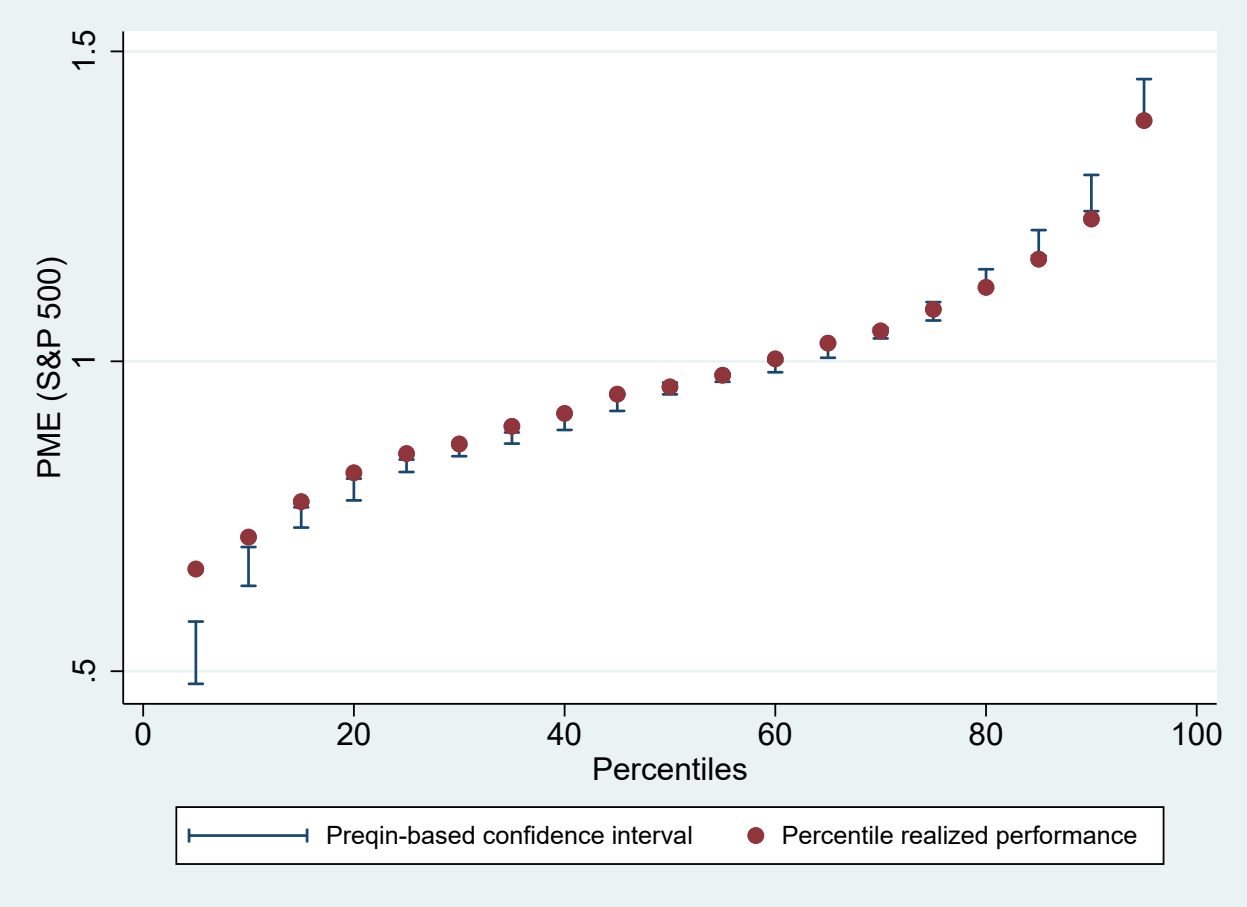


Table 1: **Asset allocation in the long-term savings market in Israel as of the end of 2019**

This table presents descriptive statistics on total assets under management (AUM, in billions of ILS) and investments in PE (buyout as well as real estate, infrastructure and debt) funds, VC and hedge funds held by LPs in our sample as of the end of 2019. Each column represents a different savings product. *Life insurance*, the largest product in terms of AUM, is offered by five of the institutions in the sample. *Provident funds* consist of two savings instruments differentiated by their investment horizon, long-term and medium term. All institutions in our data set manage both types of provident funds. *Pension funds* include two savings instruments, mandatory pension funds and voluntary funds. Both types are managed by commercial institutional investors (included in the sample), and by non-profit organizations (not included). All institutions in our data set manage pension funds. *Nostro* allocations represent the institutions' own investments; we have data on Nostro investments for five institutions. We report allocations to PE (buyout as well as real estate, infrastructure and debt), VC and hedge funds for each of the four investment categories. The percentage of total assets associated with the universe of Israeli long-term savings managers is given in parenthesis.

	Life insurance	Nostro	Provident funds	Pension	Total
AUM	375.8	155.8	321.1	673.4	1526.1
	(99%)	(87%)	(60%)	(75%)	(76%)
Private equity	19.3	6.1	12.6	26.6	64.6
	(99%)	(91%)	(61%)	(81%)	(81%)
Israel	4.4	1.9	3.8	4.6	20.2
	(97%)	(87%)	(55%)	(76%)	(75%)
Foreign	14.9	4.1	8.7	22.0	49.7
	(100%)	(94%)	(64%)	(82%)	(83%)
Venture capital	1.5	0.3	0.8	2.0	4.6
	(99%)	(95%)	(60%)	(94%)	(87%)
Israel	1.0	0.2	0.6	1.4	3.2
	(98%)	(99%)	(62%)	(92%)	(86%)
Foreign	0.5	0.1	0.2	0.6	1.4
	(100%)	(100%)	(52%)	(98%)	(88%)
Hedge funds	3.8	0.4	3.3	1.3	8.8
	(99%)	(95%)	(49%)	(71%)	(69%)
Israel	0.7	0.3	1.1	0.4	2.5
	(95%)	(99%)	(52%)	(64%)	(68%)
Foreign	3.1	0.1	2.2	0.9	6.3
	(100%)	(100%)	(48%)	(75%)	(70%)

Table 2: **The performance (PME) of private funds**

This table presents estimates of the performance of private funds including PE (buyout), VC real estate, infrastructure funds, debt and hedge funds, for each of the LPs in our sample. We label the eight institutions A to H so as not to reveal their identity. We report PME measures calculated by pooling all cash flows and NAVs for all funds invested in by each LP for the entire sample period. For benchmarks we use tradeable ETFs tracking the following indices: (1) S&P 500: the 'SPDR' ETF; (2) Russell 2000: the 'iShares Russell 2000' ETF; (3) TA 125: the 'KESEM TA 125' ETF; (4) NASDAQ: the 'QQQ' ETF; (5) MSCI World: the 'iShares MSCI World' ETF; (6) MSCI ACWI: the 'iShares MSCI ACWI' ETF. The estimates are calculated by pooling the cash flows of all funds in each year and summing the NAVs at the end of the period (for funds that are not yet liquidated). All cash flows, NAVs, and the benchmark returns are denominated in, or converted to, US dollars. Liquidated funds are defined as funds that were established before 2010.

Institution	S&P 500	Russell 2000	TA 125	NASDAQ	MSCI World	MSCI ACWI	Num of funds
A	1.02	1.11	1.13	0.94	1.14	1.15	86
B	0.94	0.98	1.09	0.83	1.09	1.10	235
C	0.91	0.98	1.07	0.79	1.08	1.09	321
D	1.11	1.21	1.18	1.04	1.21	1.22	99
E	0.88	0.93	1.01	0.78	1.03	1.04	238
F	0.99	1.05	1.04	0.89	1.11	1.12	154
G	0.98	1.03	1.06	0.85	1.15	1.16	270
H	0.97	1.06	1.04	0.89	1.08	1.09	12
All LPs	0.94	0.99	1.06	0.83	1.09	1.10	1,415
Only PE/VC	0.97	1.02	1.12	0.86	1.12	1.14	800
All except hedge funds	0.93	0.99	1.07	0.82	1.08	1.10	1,171
Liquidated funds	0.91	0.92	1.03	0.78	1.10	1.12	664

Table 3: **Performance by fund type and location**

This table presents PME estimates by pooling all cash flows and NAVs by fund type. We report performance separately for local and foreign funds. A fund is defined as local if it is incorporated in Israel, even though a local fund may invest in foreign assets. Panel A presents information on different types of equity-related funds with PMEs based on the S&P 500 and Tel Aviv 125 indices as benchmarks. We use ETFs tracking these indices: The 'SPDR' ETF and 'KESEM TA 125'. The ETFs can be found on 'investing.com.' Panel B presents information on the performance of debt funds which we benchmark using ETFs of two high yield debt indices: (1) ICE BofA US High Yield Index Option-Adjusted Spread and (2) iShares iBoxx $ High Yield Corporate Bond ETF. Cash flows, NAVs and returns are all denominated in, or converted to, US dollars.

Panel A: Equity funds				
	S&P 500	TA 125	Num. of investments	Num. of unique funds
Private equity				
Foreign	0.95	1.07	336	250
Israel	1.11	1.32	204	58
Venture capital				
Foreign	0.85	1.01	31	19
Israel	0.87	1.06	229	101
Real estate				
Foreign	0.81	0.91	155	102
Israel	0.94	1.08	20	15
Infrastructure				
Foreign	0.81	0.90	43	30
Israel	0.96	1.22	57	28
Hedge funds				
Foreign	1.04	1.00	191	115
Israel	0.98	1.05	53	29

Panel B: Debt funds				
	High Yield Bond	ishares HY	Num. of investments	Num. of unique funds
Foreign	0.93	0.97	82	62
Israel	1.08	1.11	14	10

Table 4: **Performance of funds listed in commercial data sets**

This table presents estimates of aggregate performance, by pooling all cash flows and NAVs by fund type and location, for PE and VC funds, established between 2000-2018, the same sample period as that of our main data set, as of the end of 2019. The sample is further split into different geographical regions. PMEs are calculated relative to the 'SPDR' ETF to benchmark against the S&P 500. The diversified multi-regional funds are focused on multiple market sectors, assets, and/or geographic regions.

Panel A: Preqin				
	Private equity		Venture capital	
	PME	Num. of funds	PME	Num. of funds
US	1.13	1,217	0.90	587
Israel	0.87	6	0.83	17
Asia	1.02	160	1.06	36
Africa	0.74	11	-	-
Americas	0.83	32	0.70	2
Australia	0.97	28	0.87	4
Diversified multi-regional	0.91	23	-	-
Europe	1.03	413	0.92	64

Panel B: Burgiss				
	Private equity		Venture capital	
	PME	Num. of funds	PME	Num. of funds
US	1.12	1,015	1.02	2,738
Asia & Pacific	1.14	141	1.14	460
Middle east & Africa	0.82	15	0.96	54
Americas	0.83	22	1.26	14
Europe	1.11	489	0.93	218

Table 5: **Israeli and foreign fund performance**

This table presents estimates of heterogeneity in fund performance between Israeli and foreign funds. The dependent variable is the fund PME relative to three benchmarks: Tel Aviv 125, S&P 500, and the Russell 2000. We use the ETFs which track these indices,: 'KESEM TA 125' ETF; the 'SPDR' ETF; and 'iShares Russell 2000' ETF. Cash flows, NAVs and returns are all denominated in, or converted to, US Dollars. The dummy variable *Israel* equals one if the fund is local and zero otherwise. We include fund vintage year, LP and fund type (buyout, VC, infrastructure, hedge fund, real estate, and debt) fixed effects. Buyout funds are the omitted category. Standard errors clustered at the unique fund level and the vintage year level, and are reported in parentheses. *, **, and *** represent significance at the 0.1, 0.5, and 0.01 levels, respectively.

	S&P 500			TA 125			Russell 2000		
Israel	0.113***	0.100***	0.109***	0.192***	0.171***	0.173***	0.139***	0.125***	0.125***
	(0.0340)	(0.0333)	(0.0377)	(0.0399)	(0.0391)	(0.0432)	(0.0351)	(0.0343)	(0.0382)
Debt funds			-0.0932*			-0.164***			-0.108**
			(0.0478)			(0.0562)			(0.0493)
Hedge funds			-0.0355			-0.134***			-0.0477
			(0.0423)			(0.0454)			(0.0427)
Infrastructure funds			-0.0805			-0.0905			-0.0778
			(0.0570)			(0.0671)			(0.0590)
VC funds			-0.107*			-0.145**			-0.0877
			(0.0553)			(0.0644)			(0.0572)
Real estate funds			-0.125***			-0.138***			-0.119***
			(0.0424)			(0.0472)			(0.0452)
Constant	0.497***	0.659***	0.773***	0.290***	0.480***	0.651***	0.386***	0.544***	0.649***
	(0.110)	(0.136)	(0.138)	(0.100)	(0.136)	(0.140)	(0.0997)	(0.128)	(0.132)
Vintage year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
LP FE	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Observations	1,415	1,415	1,415	1,415	1,415	1,415	1,415	1,415	1,415
R^2	0.057	0.096	0.105	0.139	0.169	0.181	0.089	0.130	0.136

Table 6: **First-time and seasoned fund performance**

This table presents estimates of differences in fund performance between first-time and seasoned funds for the entire sample of funds and within the subsamples of Israeli and foreign funds. The analysis excludes hedge funds (where the distinction between first time and seasoned funds is less clear cut). The dependent variable is the PME of each fund using the 'SPDR' ETF to benchmark against the S&P 500. Cash flows, NAVs and returns are all denominated in, or converted to, US dollars. The dummy variable *First-Time Funds* equals one for newly established funds and zero otherwise. We include fixed effects for fund vintage year, LP and fund type (buyout, VC, infrastructure, real estate, and debt). Buyout funds are the omitted category. Standard errors clustered at the unique fund level and the vintage year level, and are reported in parentheses. *, **, and *** represent significance at the 0.1, 0.5, and 0.01 levels, respectively.

	All Funds	Foreign Funds	Local Funds
First-Time Funds	-0.0676*	-0.112***	-0.0459
	(0.0351)	(0.0345)	(0.0645)
Debt Funds	-0.102**	0.000617	-0.168
	(0.0514)	(0.0477)	(0.118)
Infrastructure Funds	-0.0650	-0.0225	-0.122
	(0.0577)	(0.0544)	(0.0947)
Real Estate Funds	-0.129***	-0.0570	-0.180
	(0.0455)	(0.0416)	(0.138)
VC	-0.0447	-0.0195	-0.112*
	(0.0469)	(0.0903)	(0.0676)
Constant	0.827***	0.419***	1.044***
	(0.143)	(0.111)	(0.185)
Vintage FE	Yes	Yes	Yes
LP FE	Yes	Yes	Yes
Observations	1,171	650	521
R^2	0.127	0.169	0.159

Table 7: **Israeli and foreign fund performance - First-time and seasoned funds**

This table presents estimates of heterogeneity in fund performance across Israeli and foreign funds, split into first-time and seasoned funds. The analysis excludes hedge funds. The dependent variable is the PME of each fund relative to three benchmarks: Tel Aviv 125, S&P 500, and the Russell 2000. We use the ETFs which track these indices, 'KESEM TA 125' ETF to benchmark against the TA 125; the 'SPDR' ETF to benchmark against the S&P 500; and 'iShares Russell 2000' ETF to benchmark against the Russell 2000. Cash flows, NAVs and returns are all converted to US dollars. The dummy variable *Israel* equals one if the fund is local and zero otherwise. We include fixed effects for the vintage year of the fund, the LP, and the type of the fund (buyout, VC, infrastructure, real estate, and debt). Buyout funds are the omitted category. Standard errors clustered at the unique fund level and at the vintage year level, and are reported in parentheses. *, **, and *** represent significance at the 0.1, 0.5, and 0.01 levels, respectively.

	First time Funds			Seasoned Funds		
	S&P 500	TA 125	Russell 2000	S&P 500	TA 125	Russell 2000
Israel	0.217***	0.274***	0.223***	0.0776*	0.164***	0.102**
	(0.0764)	(0.0813)	(0.0769)	(0.0448)	(0.0615)	(0.0484)
Debt Funds	-0.0157	-0.0617	-0.0247	-0.0651	-0.0952	-0.0853
	(0.0769)	(0.0848)	(0.0792)	(0.0709)	(0.0732)	(0.0752)
Infrastructure Funds	0.148	0.234	0.181	-0.177***	-0.232***	-0.188***
	(0.150)	(0.175)	(0.156)	(0.0529)	(0.0654)	(0.0562)
Real Estate Funds	-0.0107	-0.0170	0.00590	-0.100*	-0.132**	-0.100*
	(0.0717)	(0.0786)	(0.0745)	(0.0550)	(0.0609)	(0.0594)
VC Funds	-0.0504	-0.128	-0.00114	-0.0673	-0.106	-0.0619
	(0.116)	(0.118)	(0.119)	(0.0583)	(0.0778)	(0.0630)
Constant	0.515**	0.455**	0.371*	0.759***	0.560***	0.635***
	(0.216)	(0.215)	(0.213)	(0.174)	(0.174)	(0.166)
Vintage Year FE	Yes	Yes	Yes	Yes	Yes	Yes
LP FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	440	440	440	731	731	731
R^2	0.178	0.221	0.195	0.145	0.246	0.191

Table 8: **Performance of funds with reinvestment vs. abandoned funds**

This table presents the performance of investments in funds where the LPs decided to invest in. subsequent follow-on funds ("reinvested funds") and funds where the LPs did not invest in any follow-on funds even though they were introduced ("abandoned funds"). PMEs are calculated relative to the S&P 500 using the 'SPDR' ETF. PE and VC funds are split into local and foreign funds for both reinvested and abandoned funds. *, **, and *** represent significance of one-tailed t-tests at the 0.1, 0.5, and 0.01 levels, respectively.

	Reinvested	Num. of funds	Abandoned	Num. of funds	Difference
Private equity	1.18	246	0.91	208	0.27***
Foreign	1.09	135	0.88	151	0.21***
Israel	1.29	111	0.99	57	0.30***
Venture capital	1.15	113	0.75	117	0.41***
Foreign	0.96	1	0.81	26	0.15
Israel	1.16	112	0.73	91	0.43***

Table 9: **LP experience and fund performance**

This table presents estimates of the effects of LP experience proxied by the number of past investments in PE and other private funds on subsequent performance. The dependent variable is PME relative to the S&P 500 benchmark, and the explanatory variables are the natural logarithm of the cumulative number of past investments for each LP, LP vintage year, and fund type (PE, VC, infrastructure, real estate, debt) fixed effects. Standard errors clustered at the unique fund level and at the vintage year level, and are reported in parentheses. *, **, and *** represent significance at the 0.1, 0.5, and 0.01 levels, respectively.

	All funds			Only PE/VC		
	All funds	Local funds	Foreign funds	All funds	Local funds	Foreign funds
LP experience	-0.189***	-0.113	-0.231***	-0.141	-0.0614	-0.387***
	(0.0629)	(0.0963)	(0.0687)	(0.0964)	(0.109)	(0.118)
Constant	0.720***	0.848***	0.431***	0.773***	0.940***	0.477***
	(0.132)	(0.162)	(0.0616)	(0.145)	(0.181)	(0.131)
Vintage FE	Yes	Yes	Yes	Yes	Yes	Yes
LP FE	Yes	Yes	Yes	Yes	Yes	Yes
Fund type FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,415	577	838	800	433	367
R^2	0.112	0.166	0.147	0.150	0.187	0.277

Table 10: **Comparison of fund performance with data from Preqin**

This table presents a comparison of the performance of PE and VC funds, local and foreign, in our data set and on Preqin. We calculate PME values relative to the S&P 500 using the 'SPDR' ETF. Panel A includes the average PME for funds listed in our data set and in Preqin under the exact same LP that have cash flows reported in Preqin. Panel B includes funds listed in our database and in Preqin under the exact same LP with no cash flows reported in Preqin. Panel C includes the funds listed in our data set but not in Preqin. Panel D includes the funds listed in Preqin but not in our data set. The columns present the PMEs in each data set and the number of funds. Cash flows, NAVs and returns are all denominated in, or converted to, US dollars.

Panel A: Funds in both data sets under the same LP and have cash flow in Preqin			
	PME, our data	PME, Preqin	Num. of funds
PE foreign	1.02	1.02	87
PE Israel	0.97	1.02	5
VC foreign	1.03	0.97	4
VC Israel	1.21	0.99	7
All funds	1.03	1.02	103

Panel B: Funds in both data sets under the same LP but no cash flows in Preqin			
	PME, our data	PME, Preqin	Num. of funds
PE foreign	0.90	-	69
PE Israel	1.17	-	26
VC foreign	0.88	-	14
VC Israel	0.92	-	68
All funds	0.94	-	177

Panel C: Funds listed in our database but not in Preqin			
	PME, our data	PME, Preqin	Num. of funds
PE foreign	0.91	-	94
PE Israel	0.94	-	27
VC foreign	0.96	-	1
VC Israel	0.98	-	26
All funds	0.93	-	148

Panel D: Funds listed in Preqin database but not in our database			
	PME, our data	PME, Preqin	Num. of funds
PE foreign	-	1.03	1,739
PE Israel	-	0.93	1
VC foreign	-	1.01	526
VC Israel	-	0.98	7
All funds	-	1.02	2,273

Table 11: **Fund size and country comparison**

This table presents a comparison of the country of incorporation and the average fund size, in millions of US dollars, for PE and VC funds in our data set and in Preqin. Panels A and C present the distribution of countries and average fund size for funds which are listed in our data set and in Preqin. Panels B and D present the distribution of countries and average fund size for funds included in our data set but not in Preqin . The fund size and country of incorporation for overlapping funds are collected from Preqin. The data for the non-overlapping funds are collected from our LP's and the missing information is hand-collected from the fund websites.

Panel A: Number of funds listed in our data set and in Preqin					
	U.S.	Israel	UK	Other	Total
Private equity	99	31	36	21	187
Venture capital	14	75	-	4	93

Panel B: Number of funds listed in our data set but not in Preqin					
	U.S.	Israel	UK	Other	Total
Private equity	71	27	10	13	121
Venture capital	1	26	-	-	27

Panel C: Average size (Millions of dollars) of funds listed in our data set and in Preqin					
	U.S.	Israel	UK	Other	Total
Private equity	3,580	270	4,454	1,913	2,994
Venture capital	610	102	-	239	179

Panel D: Average size (Millions of dollars) of funds listed in our data set but not in Preqin					
	U.S.	Israel	UK	Other	Total
Private equity	2,081	147	450	614	1,364
Venture capital	100	169	-	-	166

Table 12: **Probability of inclusion in Preqin**

This table presents Probit regressions estimating the effect of PE and VC fund characteristics on the probability of being listed in the Preqin. data set. We estimate the effect of fund performance using the PME, relative to the 'SPDR' ETF which tracks the S&P 500, and the IRR. Cash flows, NAVs and returns are all denominated in, or converted to, US dollars. We estimate the effect of fund size, in millions of US dollars; vintage year, with funds established before 2008 as the omitted category; and country of incorporation, with funds located in the US are the omitted category. We perform the estimation using three samples: Funds located in the US; funds located outside the US and the entire sample. Standard errors are reported in parentheses. *, **, and *** represent significance at the 0.1, 0.5, and 0.01 levels, respectively.

	PME			IRR		
	(US)	(Non-US)	(All funds)	(US)	(Non-US)	(All funds)
Performance	1.443***	0.497*	0.736***	0.0138**	0.0134**	0.0137***
	(0.526)	(0.283)	(0.255)	(0.00701)	(0.00615)	(0.00453)
Log(AUM)	0.216***	0.280***	0.212***	0.189**	0.265***	0.200***
	(0.0748)	(0.0910)	(0.0564)	(0.0770)	(0.0961)	(0.0588)
Vintage (2008 - 2010)	-0.0120	-0.212	-0.208	0.0273	-0.179	-0.246
	(0.495)	(0.361)	(0.280)	(0.510)	(0.403)	(0.299)
Vintage (2011 - 2013)	-0.355	-0.966**	-0.776***	-0.155	-1.145***	-0.809***
	(0.485)	(0.378)	(0.288)	(0.518)	(0.406)	(0.309)
Vintage (2014 - 2019)	-0.00568	-0.947***	-0.592**	0.183	-0.883***	-0.508**
	(0.424)	(0.291)	(0.233)	(0.442)	(0.319)	(0.249)
Europe		-0.719	0.540**		-0.545	0.623**
		(0.617)	(0.229)	(0.645)		(0.247)
Israel		-1.080*	-0.0169		-0.812	0.239
		(0.629)	(0.225)		(0.655)	(0.244)
Other			1.290**			1.122*
			(0.585)			(0.596)
Fund type FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	152	210	362	139	192	331
Pseudo R^2	0.11	0.15	0.11	0.07	0.15	0.11

Table 13: **Probability of the availability of cash flow data in Preqin**

This table presents Probit regressions estimating the effect of PE and VC funds characteristics on the probability of having cash flow information. reported in Preqin (the sample include only funds listed in Preqin). We estimate the effect of fund performance using the PME (relative to the 'SPDR' ETF which tracks the S&P 500), and the IRR. Cash flows, NAVs and returns are all denominated in, or converted to, US dollars. We estimate the effect of fund size (in millions of US dollars), vintage year (funds established before 2008 are the omitted category) and country of incorporation (funds located in the US are the omitted category). We perform this estimation using three samples: Funds located in the US; funds located outside the US; and the entire sample. Standard errors are reported in parentheses. *, **, and *** represent significance at the 0.1, 0.5, and 0.01 levels, respectively.

	PME			IRR		
	(US)	(Non-US)	(All funds)	(US)	(Non-US)	(All funds)
Performance	1.639**	0.737**	0.558**	0.0277**	0.0102	0.0138**
	(0.797)	(0.305)	(0.258)	(0.0109)	(0.00735)	(0.00598)
Log(AUM)	0.434***	1.112***	0.629***	0.515***	0.972***	0.709***
	(0.120)	(0.212)	(0.0980)	(0.134)	(0.177)	(0.108)
Vintage (2008 - 2010)	0.927	0.640	0.651*	0.481	0.478	0.310
	(0.693)	(0.467)	(0.363)	(0.725)	(0.461)	(0.373)
Vintage (2011 - 2013)	1.922***	0.533	1.025***	1.389*	0.418	0.658*
	(0.716)	(0.467)	(0.375)	(0.760)	(0.505)	(0.400)
Vintage (2014 - 2019)	1.388**	-0.284	0.531*	1.164*	-0.305	0.261
	(0.585)	(0.416)	(0.303)	(0.641)	(0.426)	(0.320)
Europe			-0.215			-0.459
			(0.276)		(0.286)	
Israel			-0.104			-0.0841
			(0.320)			(0.331)
Other			-0.167			-0.510
			(0.474)			(0.497)
Fund type FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	99	154	253	92	152	244
Pseudo R^2	0.25	0.50	0.39	0.28	0.48	0.42

Internet Appendix

This Internet Appendix provides supplemental and robustness tests to accompany the results presented in the paper:

Private Equity and Venture Capital Fund Performance: Evidence from a Large Sample of Israeli Limited Partners

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Table A1: **Number of commitments by vintage year**

This table presents the aggregate number of commitments by LPs throughout the sample period (by vintage year), categorized by different types of funds. Panel A presents commitments to local funds and Panel B presents the commitments to foreign funds.

Panel A: Israeli funds						
Vintage	PE	VC	Infrastructure	Real estate	Debt	Hedge fund
2000	-	6	-	-	-	-
2001	4	9	-	-	-	-
2002	4	11	-	-	-	-
2003	3	13	-	-	-	-
2004	10	3	-	-	-	-
2005	20	18	1	1	-	2
2006	21	14	3	-	-	3
2007	4	19	1	-	-	6
2008	33	32	2	2	-	7
2009	11	4	-	-	7	2
2010	4	4	1	1	-	2
2011	6	9	7	1	1	-
2012	10	13	2	1	-	1
2013	6	3	2	-	2	3
2014	9	9	6	2	1	2
2015	13	18	9	6	-	-
2016	16	13	10	1	1	2
2017	20	7	7	3	2	14
2018	10	24	6	2	-	9
Total	204	229	57	20	14	53

Panel B: Foreign funds						
Vintage	PE	VC	Infrastructure	Real estate	Debt	Hedge fund
2000	-	1	-	-	-	-
2001	-	-	-	-	-	-
2002	1	-	-	-	-	2
2003	1	-	1	1	-	6
2004	2	1	2	2	-	9
2005	8	2	4	11	5	21
2006	9	-	-	6	11	33
2007	22	5	2	13	18	18
2008	35	6	4	27	6	42
2009	1	1	1	1	1	16
2010	6	-	-	4	-	11
2011	16	2	2	2	2	9
2012	16	-	1	3	2	5
2013	13	-	1	1	1	3
2014	26	1	2	7	2	8
2015	38	3	3	13	3	-
2016	54	4	10	10	13	2
2017	39	4	1	25	10	2
2018	49	2	9	29	8	4
Total	336	31	43	155	82	191

Table A2: **LP commitments by vintage year**

This table presents the aggregate commitment in millions of US dollars by LPs in our data set throughout the sample period, categorized by different types of funds. Panel A presents the commitments to local funds and Panel B presents commitments to foreign funds.

Panel A: Israeli funds						
Vintage	PE	VC	Infrastructure	Real estate	Debt	Hedge fund
2000	-	21	-	-	-	-
2001	-	2	-	-	-	-
2002	-	11	-	-	-	-
2003	6	2	-	-	-	-
2004	73	6	-	-	-	-
2005	86	53	6	3	-	11
2006	134	32	19	-	-	10
2007	14	86	15	-	-	34
2008	305	168	7	9	-	19
2009	89	47	-	-	237	1
2010	45	9	60	12	-	7
2011	18	57	166	0	0	-
2012	186	56	44	2	-	1
2013	76	21	76	-	1	22
2014	93	22	117	28	3	12
2015	134	95	169	98	-	-
2016	90	106	91	7	-	19
2017	114	13	19	2	4	110
2018	103	71	42	14	-	76
Total	1,570	877	828	175	245	322

Panel B: Foreign funds						
Vintage	PE	VC	Infrastructure	Real estate	Debt	Hedge fund
2000	-	2	-	-	-	-
2001	-	-	-	-	-	-
2002	1	-	-	-	-	17
2003	1	-	0	1	-	33
2004	4	8	30	15	-	26
2005	104	4	56	71	33	153
2006	93	-	-	70	68	201
2007	149	38	40	108	99	119
2008	508	32	42	146	36	313
2009	27	23	9	18	2	32
2010	111	-	-	44	-	140
2011	255	40	37	21	35	12
2012	209	-	25	111	23	19
2013	186	-	11	20	123	34
2014	592	22	173	136	49	110
2015	771	40	134	233	139	-
2016	921	44	61	109	262	33
2017	658	83	19	350	429	59
2018	587	10	361	397	437	19
Total	5,176	345	996	1,850	1,735	1,320

Table A3: **Performance of private funds (all types) – Nostro accounts vs. savings products**

This table presents a weighted average PME for private funds of all types by each of the institutions in the sample, comparing the institutions' nostro account with saving products managed for external savers. The labels correspond to the institutions' labels in earlier tables. The PMEs are calculated relative to an ETF tracking the S&P 500, the 'SPDR' ETF. Cash flows, NAVs and returns are all denominated in, or converted to, US dollars.

Institution	B	C	E	F	G
Provident funds	0.97	1.35	0.88	0.91	1.06
Life insurance	0.91	0.88	0.89	0.94	0.98
Pension funds	0.97	0.92	0.88	0.96	1.02
Nostro account	0.93	0.88	0.84	1.21	0.97

Table A4: **Foreign and Israeli fund performance - Funds established prior to 2010**

This table present estimates of fund performance for Israeli and foreign funds that were established before 2010. The dependent variable is the PME of each fund relative to three benchmarks: the S&P 500, the Tel Aviv 125, and the Russell 2000. We use the ETFs which track these indices, the 'SPDR' ETF to benchmark against the S&P 500; the 'KESEM TA 125' ETF to benchmark against the TA 125; and the 'iShares Russell 2000' ETF to benchmark against the Russell 2000. Cash flows and returns are all denominated in, or converted to, US dollars (NAVs for old funds are typically zero). The dummy variable *Israel* equals one if the fund is local and zero otherwise. We control for the vintage year of the fund, the identity of the LP, and the type of the fund (buyout, VC, infrastructure, hedge fund, real estate, and debt). Buyout funds are the omitted category. Standard errors clustered at the unique fund level and at the vintage year level are reported in parentheses. *, **, and *** represent significance at the 0.1, 0.5, and 0.01 levels, respectively.

	S&P 500			TA 125			Russell 2000		
Israel	0.112*	0.135**	0.165**	0.229***	0.224***	0.211***	0.134**	0.158***	0.170**
	(0.0597)	(0.0564)	(0.0660)	(0.0691)	(0.0660)	(0.0779)	(0.0593)	(0.0561)	(0.0656)
Debt funds			-0.155			-0.284**			-0.182*
			(0.0944)			(0.110)			(0.0961)
Hedge funds			0.0188			-0.124*			-0.00234
			(0.0604)			(0.0685)		(0.0612)	
Infrastructure funds			-0.0898			-0.0849			-0.0787
			(0.111)			(0.133)			(0.109)
Real estate funds			-0.199***			-0.229***			-0.201***
			(0.0682)			(0.0795)			(0.0685)
VC funds			-0.168**			-0.210**			-0.142*
			(0.0838)			(0.0975)			(0.0845)
Constant	0.498***	1.095***	1.177***	0.259**	1.103**	1.313***	0.390***	0.988***	1.080***
	(0.118)	(0.343)	(0.359)	(0.111)	(0.437)	(0.449)	(0.108)	(0.348)	(0.366)
Vintage year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
LP FE	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Observations	664	664	664	664	664	664	664	664	664
R^2	0.046	0.105	0.127	0.116	0.155	0.174	0.059	0.119	0.137

Table A5: **Israeli and foreign fund performance, controlling for fund size**

This table presents estimates of heterogeneity in fund performance between Israeli and foreign funds controlling for size (data are available only for PE and VC funds). The dependent variable is the fund PME relative to three benchmarks: the S&P 500, and the Russell 2000. We use the ETFs which track these indices,: the 'SPDR' ETF; to benchmark against the the S&P 500; 'KESEM TA 125' ETF; and 'iShares Russell 2000' ETF. Cash flows, NAVs and returns are all denominated in, or converted to, US dollars. The dummy variable *Israel* equals one if the fund is local and zero otherwise. We include fund vintage year, LP and fund type (buyout or VC) fixed effects. Standard errors clustered at the unique fund level and the vintage year level, and are reported in parentheses. *, **, and *** represent significance at the 0.1, 0.5, and 0.01 levels, respectively.

	S&P 500			TA 125			Russell 2000		
Israel	0.112**	0.0931*	0.117**	0.174***	0.144**	0.180**	0.139**	0.117**	0.137**
	(0.0544)	(0.0535)	(0.0581)	(0.0649)	(0.0644)	(0.0696)	(0.0579)	(0.0565)	(0.0610)
Log (AUM)	0.00593	0.0154	0.00114	0.0103	0.0167	-0.00410	0.00679	0.0168	0.00516
	(0.0158)	(0.0159)	(0.0163)	(0.0182)	(0.0185)	(0.0190)	(0.0165)	(0.0165)	(0.0167)
VC funds			-0.129**			-0.188**			-0.106*
			(0.0615)			(0.0734)			(0.0634)
Constant	0.457**	0.656***	0.820***	0.230	0.466**	0.706***	0.336*	0.534***	0.669***
	(0.181)	(0.209)	(0.211)	(0.187)	(0.223)	(0.226)	(0.176)	(0.205)	(0.207)
Vintage FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
LP FE	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Observations	710	710	710	710	710	710	710	710	710
R^2	0.110	0.163	0.172	0.171	0.204	0.217	0.138	0.194	0.199

Table A6: **Comparison of fund performance with data from Preqin based on IRR**

This table presents a comparison of the performance of PE and VC funds, local and foreign, in our data set and in Preqin, using IRR as the performance metric. Panel A includes the average IRR for funds which are listed in our data set and also in Preqin and have cash flow data in Preqin. Panel B includes funds which are listed in our data set and also in Preqin, but do not have cash flow data in Preqin. Panel C includes the funds which are held by LPs in our sample but are not listed in Preqin. Cash flows, NAVs and returns are all denominated in, or converted to, US dollars.

Panel A: Funds in both data sets under the same LP and have cash flow in Preqin			
	IRR, our data	IRR, Preqin	Num. of funds
PE foreign	12.04 %	12.50 %	87
PE Israel	-6.79%	-6.46%	5
VC foreign	11.99%	10.67%	4
VC Israel	18.32%	10.74%	7
All funds	11.50%	11.24%	103

Panel B: Funds in both data sets under the same LP and do not have cash flow in Preqin			
	IRR, our data	IRR, Preqin	Num. of funds
PE foreign	5.04%	-	69
PE Israel	9.12%	-	26
VC foreign	1.74%	-	14
VC Israel	0.18%	-	68
All funds	3.44%	-	177

Panel C: Funds listed in our data set but not in Preqin			
	IRR, our data	IRR, Preqin	Num. of funds
PE foreign	1.93%	-	94
PE Israel	0.28%	-	27
VC foreign	7.77%	-	1
VC Israel	2.38%	-	26
All funds	1.81%	-	148

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